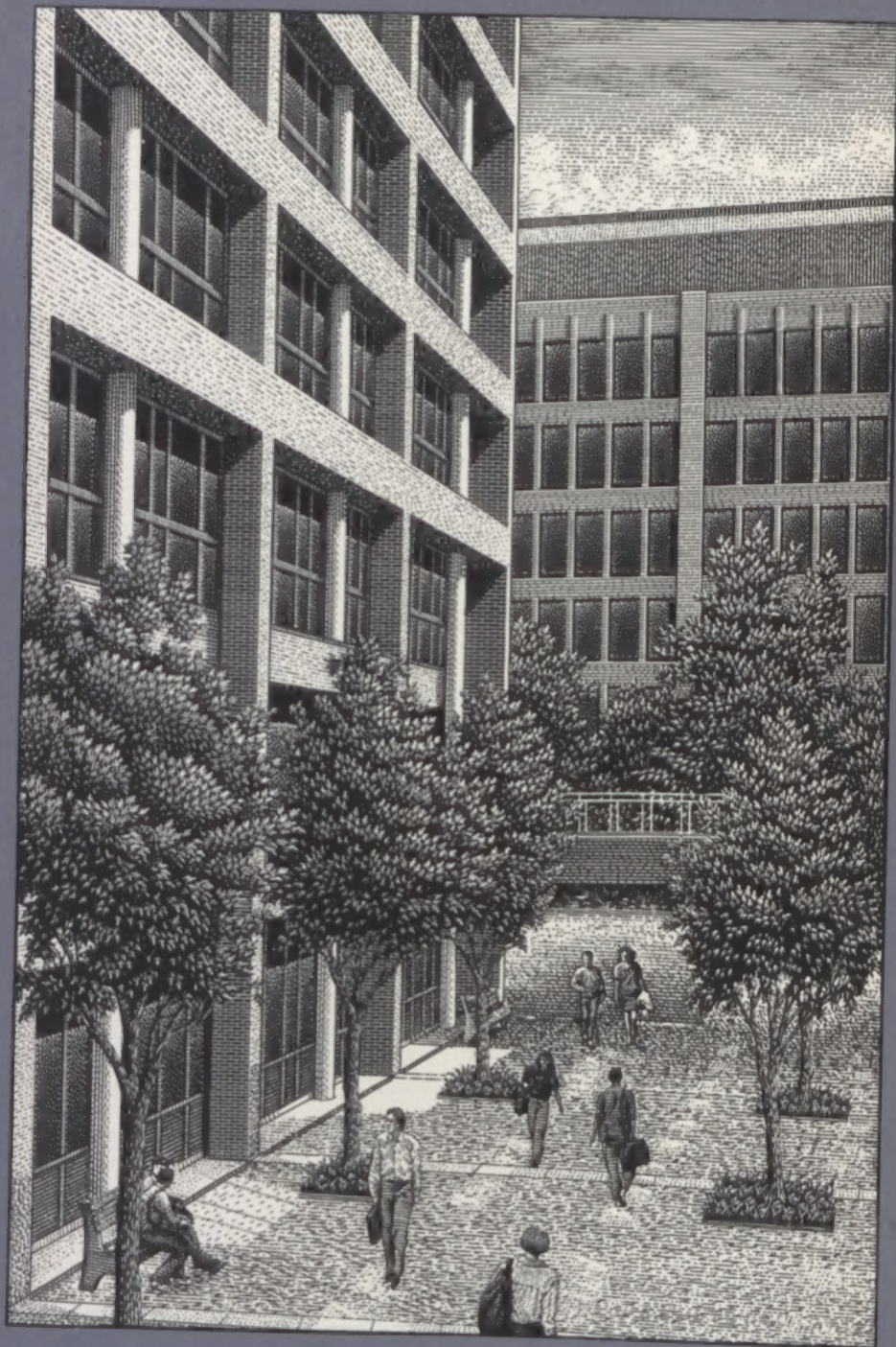


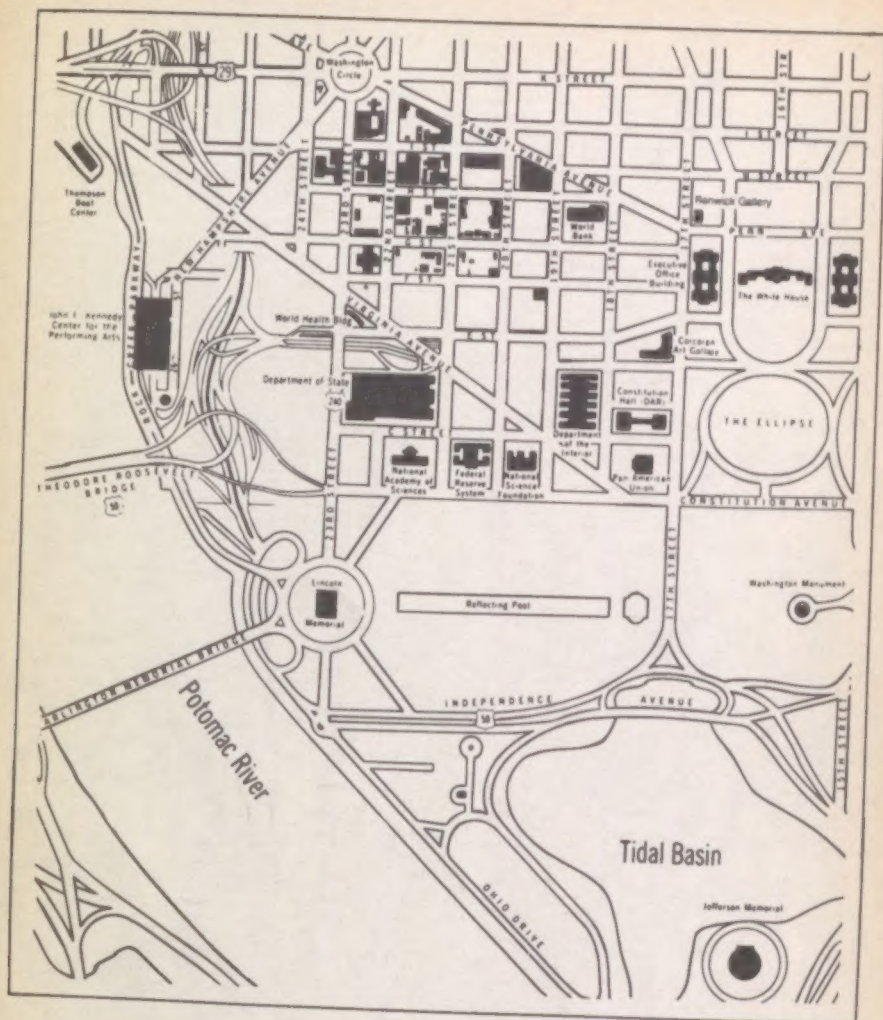
# THE GEORGE WASHINGTON UNIVERSITY BULLETIN



**UNDERGRADUATE PROGRAMS**

**1993-1994**





THE GEORGE WASHINGTON UNIVERSITY CAMPUS/WASHINGTON, D.C.

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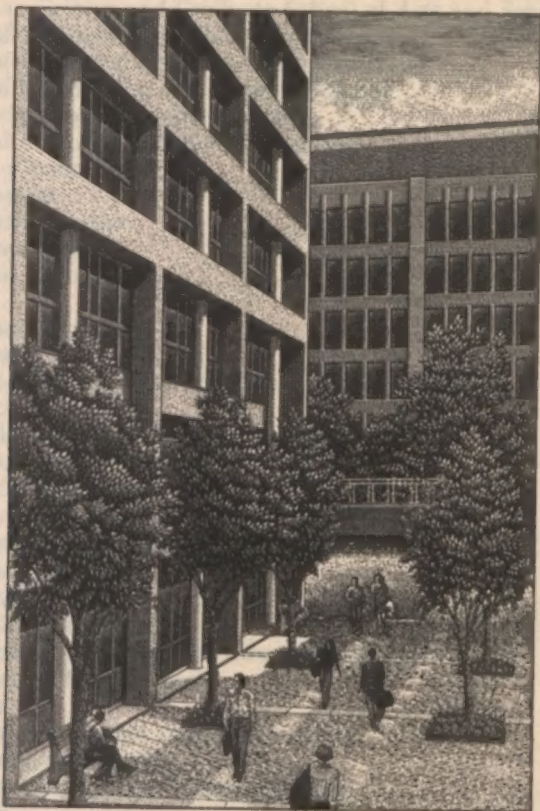
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# THE GEORGE WASHINGTON UNIVERSITY BULLETIN



## UNDERGRADUATE PROGRAMS 1993-1994

Columbian College and Graduate School of Arts and Sciences

School of Business and Public Management

School of Education and Human Development

School of Engineering and Applied Science

Elliott School of International Affairs

Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Graduate Programs, the National Law Center, the School of Medicine and Health Sciences, or the Summer Sessions, please request the appropriate Bulletin.





UNDERGRADUATE PROGRAMS 1992-1993

THE GEORGE WASHINGTON UNIVERSITY  
Columbian College and Graduate School of Arts and Sciences  
School of Business and Public Management  
School of Education and Human Development  
School of Engineering and Applied Sciences  
School of International Affairs

Information in this Bulletin is generally accurate as of fall 1992. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.



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## THE ACADEMIC CALENDAR 1993-1994

<b>August 1993</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>December 1993</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>April 1994</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
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### 1993 Fall Semester

August 26-27	Advising and testing begin for entering students
August 30	Classes begin
Aug. 30-Sept. 10	Late registration*
September 6	Labor Day (holiday)
September 10	Fall Convocation
October 1	Applications due for February graduation
October 11	Columbus Day (holiday)
November 1	Applications due for spring semester financial aid
November 8	Registration for spring semester classes begins*
November 25-26	Thanksgiving holiday
December 10	Last day of fall semester classes
December 13	Reading day
December 14-22	Examination period

### 1994 Spring Semester

January 7	Advising and testing for entering students
January 10	Classes begin
January 10-20	Late registration*
January 17	Martin Luther King Day (holiday)

\* Registration is by telephone only; consult the *Schedule of Classes*.



February 1	Applications due for May graduation
	Deadline for submission of 1994-95 financial aid applications for entering undergraduate students
February 21	George Washington's birthday observed (holiday)
March 14-18	Spring recess
April 1	Deadline for submission of 1994-95 financial aid applications for continuing undergraduate students
April 4	Registration for fall semester classes begins*
April 25	Last day of spring semester classes
April 26-27	Reading period
April 28-May 6	Examination period
May 1	Deadline for submission of summer sessions financial aid applications
May 8	Commencement

\* Registration is by telephone only; consult the *Schedule of Classes*.



## THE UNIVERSITY

### History

The George Washington University had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of 50 shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of 46 acres between the present 14th and 15th Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between 13th and 15th Streets.

During the last half-century, the University's campus has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between 19th and 24th Streets, south of Pennsylvania Avenue. The area has many reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 I Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at 19th and I Streets, and Washington selected 23rd and E Streets as the site of the National University he hoped to see established.

### Location

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the National Academy of Sciences, the John F. Kennedy Center for the Performing Arts, and many other governmental and cultural institutions.



The Virginia campus, initiated for graduate studies, research projects, and professional development programs, is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

### **Purpose and Objectives**

The purpose of The George Washington University was to realize "the aspirations of Washington, Jefferson and Madison, for the erection of a university at the seat of the Federal Government." Over the years it has been the aim to develop the University ideal in the nation's capital with a view toward meeting the changing needs of society while continuing to pursue the traditional principles of learning and research.

The George Washington University is dedicated as an institution of higher learning to promote the general advancement of human knowledge and understanding and the development of every student to his or her highest potential so that each may make the maximum contribution to the improvement of the standards, mores, and scientific and cultural climate of all peoples.

In pursuit of excellence in education, the University dedicates itself to freedom of inquiry, respect for truth, and support for research. The University is committed to preserving a curriculum that embodies the content and spirit of the liberal arts and promotes academic specialization and professional education; fostering respect and communication among different cultures; and maintaining a continuing process of institutional self-assessment and adaptation to meet the rapidly changing needs of society.

The University recognizes its special opportunities in and obligations to one of the principal capitals of the world. It is a primary objective of the University to utilize its location in the nation's capital in continuing the development of a great nationally and internationally oriented university.

### **University Policy on Equal Opportunity**

George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment. The University is subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202)994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

### **The College, Schools, and Division**

George Washington University includes eight academic units, as follows:

*Columbian College and Graduate School of Arts and Sciences* offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music and graduate programs leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, Master of Science in Forensic Science, Master of Philosophy, and Doctor of Philosophy.

*The School of Medicine and Health Sciences* offers work leading to the degrees of Associate in Science, Bachelor of Science, Master of Public Health, Master of Science in Health Sciences, and Doctor of Medicine.

*The National Law Center* offers courses leading to the degrees of Juris Doctor, Master of Laws, and Doctor of Juridical Science and special programs in continuing legal education.



The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Management, Engineer, Applied Scientist, and Doctor of Science.

The School of Education and Human Development offers undergraduate programs leading to the degrees of Bachelor of Human Services and Bachelor of Science in Exercise and Sport Science and graduate studies leading to the degrees of Master of Arts in Education and Human Development, Master of Arts in Teaching, Master of Education, Education Specialist, and Doctor of Education.

The School of Business and Public Management offers undergraduate programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration and graduate programs leading to the degrees of Master of Accountancy, Master of Association Management, Master of Business Administration, Master of Health Services Administration, Master of Public Administration, Master of Science in Information Systems Technology, Master of Taxation, Specialist in Health Services Administration, and Doctor of Philosophy.

The Elliott School of International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts.

The Division of Continuing Education assists in providing continuing education programs for adult students by administering or coordinating the graduate off-campus credit offerings of the college and schools of the University. Non-credit courses are also offered through the Division.

### Accreditation

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The National Law Center is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The Master of Public Health program has full accreditation from the Council on Education for Public Health. The Committee on Allied Health Education and Accreditation has accredited the undergraduate health sciences programs in nuclear medicine technology, radiation therapy technology, medical technology, physician assistant, and radiological sciences and administration. All undergraduate engineering curricula of the School of Engineering and Applied Science are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its eligible master's and doctoral degree programs; the master's programs in school and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs; the master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education. The School of Business and Public Management has maintained full membership in the Middle Atlantic



Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business; the Assembly accredited its undergraduate program in 1977 and its master's program in 1982. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. The Master of Public Administration program is on the approved list of the National Association of Schools of Public Affairs and Administration. The Master of Association Management degree program is recognized by the American Society of Association Executives. The Department of Chemistry is on the approved list of the American Chemical Society. The Department of Music is an accredited member of the National Association of Schools of Music. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The graduate program in speech-language pathology and audiology is accredited by the Education and Training Board of the Boards of Examiners in Speech-Language Pathology and Audiology.

### **Consortium of Universities of the Washington Metropolitan Area**

George Washington University is a member of the Consortium of Universities of the Washington Metropolitan Area. Ten universities in the Washington area—American University, Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Marymount University, the University of the District of Columbia, and the University of Maryland—are associated in a Consortium through which they coordinate the use of their respective facilities; Mount Vernon College and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings the particular courses that best meet their needs. This privilege is subject to regulations of the school in which the student is enrolled. Participation is limited to degree candidates. Law and medical students are excluded from participation, except for LL.M. candidates. See the *Schedule of Classes* for specific regulations and information concerning registration for Consortium courses.

Registration forms and instructions are available from the registrar of the institution in which the student is enrolled. Students register and pay tuition at their own institutions for all Consortium courses; course fees are payable to the visited institutions.

### **The University Libraries**

The library collections of the University are housed in the Melvin Gelman Library (the general library of the University) and in the libraries of the National Law Center and the School of Medicine and Health Sciences.

These collections contain more than 1,600,000 volumes. University appropriations supplemented by endowments and gifts provide research materials in the social sciences, the humanities, engineering, and business. Gifts from many sources have enriched the collections, including a large National Endowment for the Humanities grant to strengthen the University's humanities holdings. The libraries hold over 18,000 serials.

Information concerning the use of the libraries may be obtained at library service desks. Individual and class instruction in the use of the library and orientation to library facilities are given by librarians upon request as well as through print, media, and computer-assisted instruction.



The libraries strive to fulfill the curricular and research needs and interests of the students. Through computerized searches of bibliographic databases, students identify and locate desired research materials not easily found through more traditional methods. The staff assists all members of the University in using the rich resources of the Washington area and the unusual opportunities they offer for extensive research.

Degree candidates at George Washington University may, upon application, be issued a Consortium library card that permits direct borrowing from the main campus libraries of six other academic institutions in the Washington area. Students may also obtain books and journal articles on interlibrary loan from other libraries in the city, throughout the United States, and in various other countries.

ALADIN, the computerized catalog of library materials, lists the holdings of the Gelman Library and the libraries of six other universities in the Washington area. It also provides on-line access to selected periodical indexes. The catalog can be accessed from terminals in the libraries or from personal computers on campus or elsewhere.

### **GW Television**

The main television resource of the University is GWTV, a state-of-the-art ITFS, multichannel broadcast facility. GWTV develops courses and programs in cooperation with academic departments for broadcast off campus; produces videotapes for class use and for continuing professional education; helps expand a program of national and international teleconferences; and manages the acquisition and maintenance of television equipment and facilities in various instructional units.

GWTV has the capability to receive from and transmit to any communications satellite. Video teleconference programs are delivered to a number of on-campus locations, where participants can interact by telephone link with the originating site.

### **Office of Alumni Relations**

The Office of Alumni Relations, in conjunction with the General Alumni Association, makes available to alumni and their families a program of services and educational and cultural events. Alumni are encouraged to inquire about available services and programs at the Office of Alumni Relations and to keep the Office informed of any changes in address or occupation.

### **General Alumni Association**

The objectives of this organization are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Membership in the Association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership; in the case of the Division of Continuing Education students, however, only the "15 credit hours earned" requirement and not the "graduation of the class" requirement applies. Graduates of CCEW certificate programs are also eligible.

A Governing Board, composed of members representing the constituent alumni organizations, directs the activities of the Association. The voluntary leadership of the Association works closely with the staff of the Office of Alumni Relations in carrying out Association affairs. The Association may be contacted through the Office of Alumni Relations.



### The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Trustees who are GW alumni are indicated by an asterisk. Locations are indicated for trustees outside the Washington metropolitan area.

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 Jeffrey Scott Akman, M.D., Assistant Dean of the Medical Center, for Student Educational Policies  
 Rhonda Miller Goldberg, M.A., Assistant Dean of the Medical Center, for Student Affairs and Education  
 James Lee Scott, M.D., Assistant Dean of the Medical Center, for Student Affairs  
 John Franklin Williams, Jr., M.S., M.P.H., M.D., Assistant Dean of the Medical Center, for Admissions  
 Jarrett Michael Wise, B.S., Assistant Dean in the School of Medicine and Health Sciences  
 Alfreida Robinson, M.A., J.D., Assistant Dean of the National Law Center, for Student Affairs  
 Nancy L. Schultz, J.D., Assistant Dean of the National Law Center; Director of Legal Research and Writing  
 Robert V. Stanek, J.D., Assistant Dean of the National Law Center; Director of Admissions and Financial Aid  
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## **COLUMBIAN COLLEGE AND GRADUATE SCHOOL OF ARTS AND SCIENCES**

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### **Introduction**

Since its founding in 1821, Columbian College, the college of liberal arts and sciences of George Washington University, has been the cornerstone of a dynamic campus community in the heart of the nation's capital. A successor to the original College, the Columbian College and Graduate School of Arts and Sciences today houses all undergraduate and graduate programs in the arts and sciences, offering bachelor's, master's, and doctoral degrees. With fine facilities and a full-time faculty of about 350, the College offers its 3,300 undergraduates the advantages of a small liberal arts institution as well as opportunities for professional and pre-professional education in many fields and for internships and employment in a stimulating urban environment. The College's students come from all 50 states and from about 100 foreign countries.

The rich and diverse liberal arts and sciences curriculum is designed to strengthen the student's ability to communicate, to reason, and to understand the social, cultural, and physical environment. This purpose is accomplished through the study of various disciplines—the humanities, the social sciences, and the mathematical and natural sciences. With this foundation, Columbian College graduates are well prepared for a wide range of jobs or for more specialized professional and graduate education. The College offers programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music. Students may elect one of more than 40 departmental majors, or they may elect double majors, interdisciplinary majors, or individualized degree programs. Special curricular guidance is given to students planning to apply to a medical or law school.

### **Entrance Requirements**

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra. Typically, at least a B average or equivalent is required.
2. The principal's statement that the applicant is prepared to undertake college work.
3. Standardized test scores submitted on College Board Achievement Tests in English composition and mathematics and on either the Scholastic Aptitude Test or the American College Testing battery.
4. Admission to the Bachelor of Music curriculum requires, in addition to the above, a performance audition (a tape is acceptable) and/or music testing.

It is recommended that the College Board examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the tests. In applying for the test, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

The Student Appeals Committee will consider the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not present all of the formal requirements stated here. The Council may prescribe appropriate scholastic aptitude tests. Students admitted with deficiencies in secondary school units will be required to begin removing such deficiencies within the first year, by appropriate courses or examinations.

### **Admission With Advanced Standing**

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows.

Applicants who have accumulated at least 30 hours (or the equivalent) of academic credit at another regionally accredited college or university may be admitted to Columbian College as transfer students with advanced standing. Those who have achieved a grade-point average of at least 2.5 on a 4.0 scale in previous college work will be given preference for admission. Applicants who have completed fewer than 30 hours of acceptable credit must meet the entrance requirements for freshmen.

Advanced standing may be awarded for properly certified courses for which the student received a grade of C or above, provided that such courses are comparable to the curriculum requirements for the degree sought in Columbian College. No more than 9 credit hours of professional courses completed at another institution will be assigned toward a degree in Columbian College. In the case of course work completed at a two-year college, no more than 66 hours of credit may be applied as advanced standing toward a degree in Columbian College.

Although a grade of D in a course is not acceptable for transfer, the course may satisfy a curriculum requirement. Credits earned with a grade of D will not, however, be assigned as advanced standing.

Columbian College reserves the right to refuse credit for transfer in whole or in part or to accept credit provisionally.

It is the responsibility of the student to have an official transcript from each institution formerly attended sent directly to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students wishing to transfer from another division of the University into a degree program in Columbian College must submit to the Office of Admissions a formal application for transfer and must be in good academic standing with a cumulative grade-point average of 2.0 or above at the time of transfer. A maximum of 45 credit hours earned as a nondegree student in the Division of Continuing Education may be applied toward a degree in Columbian College.

All transfer students must satisfy the residence and course requirements for degrees awarded by Columbian College.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.



### Advisory System

Students have the responsibility for determining their schedules and meeting degree requirements. Because faculty and staff advisors can help students learn to make well-informed choices, students are required to meet with an advisor prior to registering each semester and are encouraged to keep in close touch with their advisors.

Freshmen entering Columbian College participate in an advising system designed to provide students ready access to a knowledgeable member of the faculty. In this advising system, each freshman must register for CCAS 1, the Freshman Advising Workshop; each section of the course is led by a faculty member who will serve as the student's academic advisor. CCAS 1 is required for all new College freshmen; it will be graded, but only with the grades of A or P or NP; the course does not count toward the 120 credits required for the standard B.A. or B.S. degree.

Once students declare their major, they will be advised by the faculty of their major department. Transfer students without declared majors will receive advising from an advisor assigned by the College, while those with majors will be advised by their major department. In addition, professional advisors are available year-round in the College's Student Services office for academic assistance and to provide an accurate appraisal of technical issues that may arise in any student's program of study.

In addition to the academic advising provided by the faculty and the College's professional staff, the peer advising system allows students to consult with peer advisors who have been specially trained to help students make informed choices as they construct their schedules each semester. A directory of peer advisors is available from the Student Services office.

Personal counseling is available through the office of the Dean of Students, the Counseling Center, the Multicultural Student Services Center, the International Services office, and elsewhere.

Students having academic difficulty, especially freshmen and sophomores taking lower-level courses who receive mid-semester warnings from their professors, should immediately consult with their professor or advisor in order to develop a plan for overcoming their problem. The Writing Center in the English Department and the Math Lab in the Mathematics Department both offer walk-in and by-appointment assistance; peer tutors are available through the Dean of Students office; study skills workshops are provided by the Counseling Center.

### Scholarship Requirements

#### Academic Work Load

To encourage academic performance of high quality, the College limits the student's work load.

A full-time student not on probation may take a course load of as much as 18 credit hours. The amount of work taken by a student on probation will be limited by the Dean's Council.

A full-time student who, during the immediately preceding semester, has received no grades below B- and has earned grades of A or A- in three courses totaling at least 9 credit hours may take 19 hours.

A student who accepts employment after registration or at any time during a semester must immediately report that fact to the dean so that the academic program may be adjusted, if necessary. A student employed 20 or more hours per week should not attempt more than 10 credit hours per semester or 4 credit hours per summer session.

### Attendance

The student is held responsible for all the work of the course in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up work missed.

### Classification of Students

A student becomes a *sophomore* upon completion of 30 credit hours, a *junior* upon completion of 60 credit hours, and a *senior* upon completion of 90 credit hours.

An *unclassified* student is one who is not a candidate for a bachelor's degree (normally because the student already holds one) but who wishes for valid academic reason to take a limited program for a limited time.

### Leave of Absence and Continuous Enrollment

Students in Columbian College who wish to interrupt their studies must apply to the dean for either Continuous Enrollment or Leave of Absence (see University Regulations). If approved, either form of inactive status assures the student that, for at least one semester, re-entrance to the College may take place under regulations prevailing at the time of last registration. A student may re-apply for a second semester of either type of leave, but ordinarily such leave is only available for one calendar year. After two semesters of inactive status, the student is expected to resume active study toward a degree.

All study toward a degree program at any other college or university, in this country or abroad, undertaken by a continuing student must be approved by the dean in advance.

### Academic Standing

A student who is not suspended or on probation is considered to be in good standing.

The following rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 credit hours or more) during the fall or spring semester. Students enrolled for less than 12 credit hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their cumulative record, a "semester" being considered a time interval in which at least 12 credit hours have accrued.

**Probation**—A student whose cumulative grade-point average is less than 2.0 (but 1.0 or more) after attempting a minimum of 24 credit hours will be placed on probation. The course load of a student on probation shall be no more than 13 credit hours. Probation will be removed if, after a first or second semester on probation, the student's grade-point average is raised to 2.0 or more. A student still on probation after two semesters (or 24 credit hours attempted) ordinarily will be suspended but may be continued on probation by the Dean's Council (see below).

**Suspension**—The following circumstances constitute grounds for suspension: (1) a cumulative grade-point average below 1.0 after attempting a minimum of 24 credit hours, and (2) failure to attain a cumulative grade-point average of 2.0 or more after two successive semesters (or 24 credit hours attempted) on probation. The Dean's Council may continue a student on probation (in lieu of suspension) if satisfactory progress is demonstrated during the probationary period and/or sufficient evidence of academic promise, by way of a statement of appeal, is offered by the student.

The minimum period of academic suspension is one fall or one spring semester. Final dates for applying for readmission are the same as those governing



undergraduate admission (see Admissions). A suspended student seeking readmission must submit evidence to the Dean's Council of conduct during absence from the University that indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

**Semester Warning**—A student whose cumulative grade-point average is less than 2.0 after attempting a minimum of 12 credit hours will be issued a warning notice at the end of the semester by the Office of the Dean and shall be strongly advised to take corrective measures (e.g., limitation of course load to no more than 13 credit hours).

**Mid-semester Warning**—When, at the end of the eighth week of each semester, instructors file in the Office of the Dean the names of freshman and sophomore students who are doing unsatisfactory work, a notice of warning is sent to the student and a copy filed with the appropriate advisor. A warning constitutes notice to the student to consult the instructor and advisor at the earliest opportunity.

### **Adding and Dropping Courses**

After registering, a student may add or drop courses only by means of procedures established by the Registrar. Failure to follow these procedures when dropping a course may result in a failing grade. The deadline for adding a course during the regular fall or spring semester is the end of the second week of classes.

The deadline for dropping a course without academic penalty is the end of the eighth week of classes in the fall and spring semesters. A course dropped during the first four weeks of classes will not appear on a student's transcript. A course dropped after the fourth week but before the end of the eighth week will be assigned the grade of W (authorized withdrawal).

The deadline for complete withdrawal from a student's entire program of courses without academic penalty is the end of the ninth week of classes.

After the deadlines, program changes are not possible unless the student presents a petition to the Student Appeals Committee and receives permission.

### **Incompletes**

Conditions under which the grade of I (Incomplete) may be assigned are described under University Regulations.

**Changing an Incomplete**—Incomplete work must be completed no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of I is assigned. When work for the course is completed, the grade earned will be indicated in the form of I/ followed by the grade. The indication of I/ cannot be removed from the transcript. A grade of I that is not changed within this period automatically becomes an I/F. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean or the appropriate committee for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of I cannot be changed by reregistering for the course here or by taking its equivalent elsewhere.

### **Dean's List**

The name of any student who takes 15 credit hours or more of graded course work in any one semester and attains a semester grade-point average of 3.5 or more with no grades below B- will be placed on the Dean's List for that semester. A course taken on a Pass/No Pass basis beyond the 15-hour minimum of other courses does not affect the student's eligibility for the Dean's List, nor are the credit hours of such a course computed in the above figures. A grade of No Pass, however, disqualifies the student from the Dean's List.

## **The Bachelor's Degrees**

Columbian College offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music. In cooperation with the School of Medicine and Health Sciences, two seven-year curriculums leading to the combined degrees of Bachelor of Arts and Doctor of Medicine and the Integrated Bachelor of Arts/Doctor of Medicine are offered.

One hundred twenty hours of course work must be passed and a grade-point average of at least 2.0 maintained. General curriculum, major, and other requirements described below must be met.

Each student must declare a major, usually in the sophomore year. A student may change the major with the consent of the dean and of the department or committee concerned; the student must meet the requirements for the new major in effect at the time the change is approved. At least 60 hours of course work must be taken outside the major-field department or major program. (This does not apply to the Bachelor of Arts curriculum in dance nor to the 129-hour Bachelor of Music curriculum.)

See Scholarship Requirements under University Regulations for an explanation of how the grade-point average is computed. See Scholarship Performance in the Major, below, for requirements applicable specifically to major programs.

All students, including those transferring from other institutions or from another school or division of this University, with major requirements wholly or substantially met, must satisfy the residence requirement of Columbian College stated below.

### **Residence**

Students must complete 45 of their final 60 hours toward their degrees in the College, including at least 12 hours in the major field. (Students approved for study abroad must complete 45 of their final 75 hours in the College.) Except in special circumstances, and then only with the approval of the dean, at least 9 of the final 15 hours must be completed in residence.

Courses applicable to the degree taken while registered in any division of The George Washington University in the semester immediately prior to admission to degree candidacy in Columbian College are counted as courses in residence.

Summer work in residence may be counted toward all Columbian College degrees.

### **Combined Degrees of Bachelor of Arts and Doctor of Medicine**

A candidate for the combined degrees of Bachelor of Arts and Doctor of Medicine must (1) complete the entrance requirements for the Doctor of Medicine degree in the George Washington University School of Medicine and Health Sciences; (2) complete the general Columbian College course requirements; (3) earn 90 credit hours in the liberal arts, including a minimum of 30 in 100-level courses in Columbian College; (4) obtain the approval of the dean of Columbian College at the time of entering the School of Medicine and Health Sciences; (5) obtain the recommendation of the Dean for Academic Affairs of the Medical Center at the completion of all prescribed courses in the first year of the Doctor of Medicine program, at which time the degree of Bachelor of Arts will be conferred (professional credit courses taken at another institution do not count toward the combined degrees); (6) maintain throughout the entire course the scholarship level required for graduation.

### **Integrated Bachelor of Arts/Doctor of Medicine**

In addition to the combined B.A./M.D. described above and the early selection program described under the School of Medicine and Health Sciences, the



University offers a seven-year integrated B.A./M.D. program. The program has been designed for honors students of high ability and maturity who have decided, before applying to college, that they wish to become physicians and want to accomplish that goal in a shorter amount of time and at a lower overall cost than is usual. Detailed information on this program is available through the College.

### **Second Bachelor's Degree**

Columbian College graduates who wish to receive a second bachelor's degree must satisfy the general College requirements and the requirements of their new major and degree and must complete 30 hours in residence in Columbian College. Students with undergraduate degrees from other institutions or from other divisions of the University, if admitted to the College, must meet the same set of requirements.

### **Placement, Waiver, and Credit Examinations**

#### **Preliminary Placement Examinations**

Many departments in Columbian College, including English, mathematics, and all foreign languages, require students to take placement tests to determine level of proficiency or eligibility for specified courses. The student is placed in an appropriate course on the basis of these tests. There is no charge to the student for placement tests, and no credit (advanced standing) is awarded for courses bypassed or waived as a result of these tests.

**English**—Students whose scores on either the Test of Standard Written English or on the English Composition Achievement Test suggest that they will benefit from more intensive training in compositional skills may be assigned to Engl 9 or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill before placement in either Engl 9 or 10. Students whose scores indicate superior competence will be allowed to waive the Engl 10 requirement.

**English as a Foreign Language**—see Admissions.

**Foreign Languages**—A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination in one of the following: Chinese, French, German, Greek, Hebrew, Italian, Japanese, Korean, Latin, Portuguese, Russian, or Spanish. Upon completion of the examination, assignment is made to the appropriate course.

**Mathematics**—New students who wish to register in Math 30, 31, or 41 are required, prior to registration, to take a placement examination in algebra and trigonometry; those wishing to register in Math 51 are required, prior to registration, to take a placement examination in algebra.

#### **Earning Credit by Examination**

Assuming there is no duplication of course work earned, a maximum of 30 credit hours may be assigned for any combination of the following:

**College Board Advanced Placement Tests**—See Admissions. Credit may be granted for college-level courses taken in an approved secondary school if substantiated by satisfactory performance on the Advanced Placement Tests.

**College Board College-Level Examination Program (CLEP)**—See Admissions. Prior to matriculation, credit may be assigned for CLEP General Examinations passed at the 50th percentile or above. Credit may be assigned for any CLEP Subject Examinations passed at the level recommended in the College Board model policy. The General Examination in English composition and a few Subject Examinations are unacceptable for credit. After matriculation, credit for CLEP Subject Examinations will not be assigned without special authorization by the Columbian College department governing the subject involved.

**Special Departmental Examinations**—A student may request any department of Columbian College to offer a special examination covering the subject matter of any specific course. (If an appropriate CLEP Subject Examination is available, the department may choose to employ it.) The student must offer evidence of sufficient background to have a reasonable command of the subject matter. Departments reserve the right to deny such requests. Credit by special departmental examination is not permitted for the first two years of college-level courses in a native language other than English. A student who has previously taken examinations to waive course requirements may not subsequently take examinations for credit in the same courses. Assigning credit (or waiving a requirement) by special departmental examinations will depend on the department's evaluation of the examination paper. These examinations will normally be of at least three hours' duration. A fee for each course examination is charged for preparation, administration, and grading of the examination.

### **Waiving Introductory Courses by Examination**

Several departments in Columbian College, including English, history, and sociology, offer periodic waiver examinations for introductory courses. Such examinations may be attempted at the option of the student; a fee is charged. Specific departments should be consulted for further details. Passing a waiver examination does not entitle a student to any credit toward the degree.

### **General Curriculum Requirements**

All candidates for the degree of Bachelor of Arts or Bachelor of Science are admitted to a general arts and sciences curriculum until they declare a major field. Students should plan to satisfy most of their general curriculum requirements before they commit themselves to a specific major; most students select a major near the end of their sophomore year. General curriculum requirements are established by the College faculty as a whole and administered through its elected committees. Other curriculum requirements are administered by the major-field departments or programs. (Bachelor of Music candidates are admitted directly into the departmental curriculum.)

Students are obliged to demonstrate, either by course work or through examination, that they have attained an acceptable level of cultural literacy and intellectual competence and that they have acquired familiarity with the breadth and diversity of liberal learning.

Students must satisfy these requirements in eight distinct areas and should begin to do so in their first semester, because these fundamental competences and areas of knowledge often form a basis for future course work. No course may be taken to fulfill requirements in more than one of the eight categories, even though some courses may be listed in more than one category. Students may satisfy all or part of a specific requirement either through course work or by examination.

The eight categories of general curriculum requirements are listed below, along with specifically approved courses. Additional courses beyond those listed in each category may be authorized from time to time by the Curriculum Committee. Please consult the Office of the Dean, Student Services, for a supplemental list of appropriate courses prior to registration each semester. Unless otherwise specified, the indicated paired sequences of courses must be selected.

1. **Literacy**—6 hours: Engl 9 or 10 or EFL 50, and Engl 11 or 13. Unless waived, the first semester of English composition must be taken in the freshman year. The second semester (Engl 11 or 13) must be taken no later than the second semester of the sophomore year.

2. **Quantitative and/or Logical Reasoning**—6 hours chosen from one of the following combinations: Phil 45 and 121; Stat 51 or 53 or 91, and 105 or 129; Stat



111-12 or 129-30; Math 9 and 10, 12 and 13, 30 and 31, 30 and 41, or 51-52; Phil 45 and Math 120 or Stat 51 or 53 or 91; Honr 23-24.

3. *Conceptual Foundations and Development of Natural Science*—9 hours chosen from the courses listed below, distributed so that 3 or 6 hours come from Group A and 3 or 6 hours come from Group B (the 6-hour group must be a paired sequence): Group A: BiSc 3-4 or 11-12; Geol 1-2; Geol 5 and either 2 or 105; Honr 36. Group B: Chem 3-4 or 11-12 or 17-18; Honr 33-34; Phys 1-2 with 5-6; Phys 9-10; Phys 21-22 with 5-6.

4. *Social and Behavioral Sciences*—6 hours chosen from one of the following combinations: Econ 11-12; Geog 1 and 2; Honr 43-44; PSc 1 and 2; PSc 3-4; or any two of the following courses: Anth 2, Psyc 1, Soc 1, SpHr 71.

5. *Creative and Performing Arts*—3 hours chosen from the following: Art 21, 23, or 41; Comm 171; Engl 81; Mus 3, 4, 7, 8, or Hon 53, or applied music courses in voice, a single instrument, or jazz performance (Mus 11-50, 57-60, 153); Phil 162; TrDa 11, 14, 45, 46, or 50-65.

6. *Literature*—6 hours chosen from one of the following combinations: Chin 163-64; Clas 107 and 108; Engl 51-52; Engl 61-62; Engl 71-72; Fren 53 and 54; Ger 51-52; Ger 103-4; Ger 112 and 114; Honr 63-64; Japn 111-12; Rel 9-10; Slav 91-92; Span 53 and 54, 55 and 56. (Additionally, students may satisfy this requirement by completing 6 hours of course work at the 100-level in a single foreign literary tradition taught in the foreign language.)

7. *Western Society and Civilization*—6 hours chosen from one of the following combinations: AmCv 71-72; Art 31-32; Clas 71-72; Hist 39-40; Hist 71-72; Honr 71-72; Hmn 1-2, 4-5; Phil 51-52; Rel 1-2.

8. *Foreign Language or Culture*—either option A or option B as follows.

A. *Foreign Language*—A student must demonstrate competence beyond the elementary level in a language other than English taught at GW. A student who wishes to continue the same language studied in high school must take the language placement test; in some cases, placement may be determined by performance on standardized achievement tests.

In order to satisfy this requirement, the student must demonstrate competence at the level of the following courses, by either course work or examination: Chin 4 or 6; Clas 3 or 13 or 24; Fren 3; Ger 4 or 6; Honr 82; Ital 3; Japn 4; Kor 4; Port 3; Slav 4 or 6; Span 3.

The student should be aware that in many instances foreign languages are required for the major or recommended as preparation for advanced work. The student should consult the advisor so that foreign language may be included, as appropriate, in the student's program.

B. *Foreign Culture*—6 hours chosen from one of the seven categories listed below. Courses listed singly may be combined with other single courses within the same category. (1) *East Asia*—Art 120; Chin 161; Chin 163-64; Hist 196; Hmn 6; IAff 91; Japn 111-12; Rel 160. (2) *Middle East*—Anth 177; Geog 154; Hist 193; Hist 194; Rel 161. (3) *Latin America*—Anth 172; Geog 161; Hist 161; Hist 162; Hist 163; Hist 164; IAff 90; PSc 183. (4) *Africa*—Anth 178; Hist 116; IAff 93; PSc 180; PSc 181. (5) *Russia/Soviet Union*—Hist 145; Hist 146; Slav 91-92; Slav 161-62. (6) *South Asia*—Hmn 6; Rel 157; Rel 158; Rel 159. (7) *Western Europe*—Hist 131-32; Hist 136; Hist 141 and 142; PSc 130.

### The Major

In order to declare a major, all students must secure the advisor's signature on a proper form (obtainable in the Office of the Dean, Columbian College Undergraduate Student Services) and return the form to the Office of Columbian College. No student is considered to have a major until this process is completed. Thereafter, the student receives academic guidance from a faculty advisor in the major-field department.

In most cases, filing of the approved declaration form assures the student of admission to the major declared; however, if space, equipment, or other requirements compel a department or major program to limit the number of students in that major, admission to the major may be on a selective or space-available basis.

A change in degree candidacy within Columbian College (e.g., from Bachelor of Arts to Bachelor of Science) requires the permission of the Dean. The degree requirements effective at the time the change is approved must be met.

### Major Fields

All fields listed below (except those offered by the Department of Statistics/Computer and Information Systems) may lead to the Bachelor of Arts degree; a Bachelor of Science degree may be elected in those fields indicated by an asterisk.

Anthropology	Germanic Languages and Literatures
*Applied Mathematics	History
Art History	Journalism
Art History/Fine Arts	Judaic Studies
*Biology	*Mathematics
*Chemistry	Music
Chinese Language and Literature	Philosophy
Classical Archaeology and Anthropology	*Physics
Classical Archaeology and Classics	Political Communication
Classical Humanities	Political Science
*Computer and Information Systems	Program in the Liberal Arts
Criminal Justice	Psychology
Dance	Radio-Television
Dramatic Literature	Religion
Early Modern European Studies	Russian Language and Literature
Economics	Sociology
English	Spanish-American Literature
*Environmental Studies	Spanish Language and Literature
Fine Arts	Speech Communication
French Language and Literature	Speech and Hearing Science
Geography	*Statistics
*Geology	*Statistics (Computer Science option)
	Theatre

### Scholarship Performance in the Major

Majors are defined in terms of credit hours, required courses, and the attainment of grades no lower than C – in the minimum required 100-level courses taken in the major field. If a student receives a grade of D in a 100-level course specifically required in the major, the major department or program may permit the course to satisfy a curricular requirement even though it would not normally count toward the minimum number of hours required for the major. However, the department or program may instead require the student to repeat the course until a satisfactory grade (C – or better) is earned. (The department chair or program director must authorize such repetition in a memo to the Office of the Dean. Student Services, before the student may register a second time.) Once the student has completed the course with a satisfactory grade, credit hours earned the first time the course was taken will count toward the minimum number of hours required in the major. Credit earned for the repetition will not count toward the degree. The minimum specific requirements for majors are listed below the staff of instruction of the department concerned. The chair of the department, or designated departmental advisor, should be consulted before registration concerning the student's program of courses; and the entire program, including electives,



must be approved by the department. The student is also expected to consult the chair or advisor in all matters affecting the program of studies, such as changes, substitutions, or withdrawals, and especially concerning the student's progress in a course.

Some majors require satisfactory completion of entry, proficiency, or concluding examinations in addition to courses.

### **Double Majors**

With the prior approval of the departments concerned, a student who completes the requirements of two major fields in Columbian College (for example, mathematics and physics, or English and French, or history and economics) may graduate with a double major. Such a student should consult with advisors in the two departments concerned and officially declare both majors on the appropriate form available in the dean's office. A major field in Columbian College cannot be combined with a major field offered by another degree-granting unit of the University. A student may pursue two majors at the same time, even though one is toward a B.A. and the other is toward a B.S.

### **Interdisciplinary Programs**

*Regular Interdisciplinary Programs*—Programs include Classical Archaeology and Anthropology, Classical Archaeology and Classics, Early Modern European Studies, Environmental Studies, Judaic Studies, and Political Communication.

*Special Interdisciplinary Programs*—A student who finds no existing major or program suited to individual educational goals may develop a special major program, in consultation with appropriate departmental advisors. Only students with above-average records (generally a B average or better) will be eligible for such programs. Normally, the proposed program of study must be submitted for approval by the end of September in the student's junior year. Final approval of such a program rests with the Curriculum Committee. Only programs with valid and clearly defined academic goals will be approved, and each shall be designated by a title suggested by the student to the Committee on Curriculum for approval. At least 45 credit hours of the approved program must be completed in Columbian College. Because of their broad scope, such interdisciplinary majors may not be combined with a double major.

A student in an interdisciplinary program will be expected, during the second semester of the senior year, to take a comprehensive examination (either oral or written) in the interdisciplinary field, or to undertake a senior comprehensive thesis, at the discretion of the student's interdepartmental committee.

*Special Interdisciplinary Courses*—Under the supervision of the Committee on Curriculum, new courses combining the methods and insights of several disciplines will be offered each semester. Interested students should consult the current *Schedule of Classes*, where such courses are numbered in the 700s. A student wishing to use any of these courses to satisfy the general curriculum requirements should consult the sponsoring department.

*Program in the Liberal Arts*—Directed by the Curriculum Committee of Columbian College, this program is designed to provide a general education in the liberal arts, with or without another major, as the student chooses. It offers opportunity for achieving a substantial acquaintance with each of the three divisions of knowledge through a selection of courses that cultivate a broad perspective in time and in national and/or cultural traditions. The committee appointed to advise students in the program consists of one representative each from the humanities, the social sciences, and the natural and mathematical sciences. For curriculum requirements, see Liberal Arts, under Courses of Instruction.

## Minors and Secondary Fields

### Minors

Students who wish to familiarize themselves with a field outside their major may graduate with a minor in addition to the major. Not all Columbian College departments offer undergraduate minors; the requirements prescribed by those that do are listed under the department involved. A student interested in a minor should consult faculty advisors in the department concerned and declare both major and minor programs on the appropriate form available in the dean's office.

At least one-half of the course work required for a minor must be done in residence. Grades of C- or better must be earned in second-group courses, including such courses transferred as advanced standing from another institution. Courses passed with a grade below C- may be used to fulfill a minor field curricular requirement but may not be counted toward the total number of credit hours required for the minor.

When taken by a student enrolled at the University in a school other than Columbian College, such minors are designated secondary fields. The same curricular and scholarship requirements apply to secondary fields as to minors.

In addition, students in other undergraduate divisions of the University may pursue major requirements to earn a secondary field when there is no appropriate minor.

Minors are available in the following fields.

American Civilization	History
Applied Ethics	Japanese Language and Literature
Archaeology	Journalism
Art History	Judaic Studies
Art History/Fine Arts	Linguistics
Biological Anthropology	Mathematics
Biology	Music
Chemistry	Peace Studies
Chinese Language and Literature	Philosophy
Classical Humanities	Physics
Computer and Information Systems	Political Science
Creative Writing	Psychology
Cross-Cultural Communication	Religion
Dance	Russian Language and Literature
Economics	Sociocultural Anthropology
English	Sociology
Fine Arts	Spanish Language and Literature
French Language and Literature	Speech Communication
General Anthropology	Speech and Hearing
Geography	Statistics
Geology	Theatre
German	Women's Studies

### Secondary Fields

Just as students enrolled at the University but outside the College may pursue College minors as secondary fields, such study is permitted College students in other schools of the University. Secondary fields are available in the School of Education and Human Development, the School of Engineering and Applied Science, the School of Business and Public Management, and the Elliott School of International Affairs. Interested students should consult with their academic advisors.

Columbian College students are limited in the number of hours they may take in courses outside the College (so-called "professional credit" courses). Refer to the paragraph below.



## **Other Academic Regulations**

### **Courses Outside Columbian College**

Courses in schools of the University other than Columbian College may be taken to fulfill curriculum requirements, with approval of the major department. However, no more than 18 credit hours of such courses may count toward bachelor's degrees in Columbian College. (No credit is allowed toward the degree for exercise and sport activities courses.) Students who have extraordinary reasons for exceeding the 18-hour limit must receive prior approval from the dean. Pursuing a secondary field does not increase the 18-hour limit.

No more than 45 credit hours of courses completed by a student while in nondegree status in the Division of Continuing Education may be applied toward a degree in Columbian College.

**Naval Science**—For information on naval science courses and the Naval Reserve Officers Training Corps, see Naval Science, under Courses of Instruction.

### **Service-Learning Program**

A maximum of 15 credit hours in Service-Learning Program courses may be credited toward bachelor's degrees in Columbian College.

### **Earning an Additional Hour of Credit**

Normally, no deviation is permitted from the number of hours of credit given in parentheses after the title of each course. In exceptional circumstances, however, and with the prior approval in writing of the instructor and the dean, a student may register for and earn an additional hour of credit in certain appropriate 100-level courses within the College by doing a significant amount of extra work as assigned and supervised by the instructor.

### **Pass/No Pass Option**

A junior or senior student in Columbian College who is in good standing may, with the approval of the advisor and the dean, take one course a semester and receive a grade of P, Pass, or NP, No Pass. No student will be allowed to take more than four pass/no pass courses under this regulation. The student may, however, also receive grades of P/NP in proseminars for certain majors and in other courses normally using such grades. A student must sign up for the pass/no pass option at registration. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of the drop period or the eighth week of class. Courses required for the College's general curriculum requirements or in the student's major or minor field (including those courses required for the major that are offered by other departments) may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment in this University.

### **Tutorial Study**

A junior or senior of demonstrated capacity, with a special interest in the subject matter of a regularly listed course, may be permitted to take tutorial study in residence under the personal direction of the instructor, in accordance with the rules of the appropriate department and with the approval of the dean. Credit under this plan is limited to the specific credit hours of credit designated for each course in the list of courses of instruction. It assumes frequent and regular conferences between the student and instructor.

### **Premedical Curriculum**

A premedical student who intends to work toward a bachelor's degree fulfills the general requirements of Columbian College stated above and may select any major-field curriculum of any Columbian College department. Each premedical program must be approved by the premedical advisor. For admission to most medical schools, the student must have a minimum of 90 credit hours applicable toward a degree in an approved college of arts and sciences; the 90 hours must include

**Biology**—8 credit hours, including laboratory. This may be either in general biology or zoology but may not include separately credited courses in botany.

**Chemistry**—8 credit hours of general inorganic chemistry (which may include qualitative analysis), including laboratory, and 6–8 credit hours of organic chemistry, including laboratory

**Physics**—8 credit hours, including laboratory

**English**—6 credit hours. This may be the usual introductory English composition course or its equivalent.

Many medical schools have additional entrance requirements, among which are courses in biochemistry, embryology, histology, genetics, and mathematics. Even when such courses are not actually required, they are strongly recommended. With the exception of these specific requirements, applicants are urged to follow their personal interests in developing their premedical courses of study. A well-balanced program, rather than a specific field, is the criterion by which an applicant is judged. It is not advisable to take courses that appear to cover subject matter in the medical program. Although well-qualified candidates are eligible for admission after completing the minimum 90-credit-hour requirement, the majority of applicants are found to be better prepared for the study of medicine after four years of college work.

### **Preparation for Law School**

A broad liberal education is the best undergraduate preparation for law school. Columbian College, therefore, does not prescribe a prelegal curriculum. However, through its Office of Student Services, Columbian College provides students with advice about academic preparation for law school.



## **SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT**

Dean F.D. Fowler

Associate Deans L. Graff, R.F. Dyer

### **Introduction**

Organized as the School of Government in 1928, the School of Business and Public Management has been responsible for over half a century for the professional development of individuals assuming leadership roles in society. The School comprises eight departments—Accountancy; Finance; Health Services Management and Policy; International Business; Management Science; Marketing, Logistics, and Operations Management; Public Administration; and Strategic Management and Public Policy. The use of a multidisciplinary approach in educational programming helps prepare both the generalist and specialist for professional careers in today's complex, organizational society.

The School of Business and Public Management is a member of the Middle Atlantic Association of Colleges of Business Administration and the American Assembly of Collegiate Schools of Business, and its Bachelor of Business Administration program is accredited by the Assembly.

### **Purposes**

The School of Business and Public Management is dedicated to academic excellence through the study, teaching, and research of management and policy in the public and private sectors, both within the United States and internationally.

Because of the growing interdependence of government and business, the School of Business and Public Management practices a multidisciplinary approach with flexibility in educational programming in the belief that such is essential to dealing with the complexities of today's organizational society. The School offers preparation of both the generalist and the specialist for professional careers and seeks to improve the quality and character of the individual as citizen, professional, and scholar as well.

More specifically, the purposes of the School are

1. To prepare its graduates for positions in the management of complex organizations.
2. To provide a broad and fundamental education as preparation for positions carrying management and leadership responsibilities.
3. To provide specialized educational opportunities as preparation for career positions in professional disciplines or functional areas.
4. To explore in all their forms, through education and research, the content, interactions, and interdependencies of disciplines and institutions in the public and private sectors, both nationally and internationally.
5. To make available the School's resources to business, health, government, community, and other organizations in both the metropolitan area and the larger community.
6. To foster understanding and advancement of knowledge and skills in the world community through research, education, and scholarly exchange with governments, institutions, and organizations engaged in the solution of international trade and investment problems and in the management of human settlements.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

**Attendance**

A student may not attend classes until registration is completed. The student is held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. A student suspended for any cause may not attend classes at GW during the period of suspension.

**Withdrawal**

Withdrawal from a course or from the University without academic penalty is permitted during the first four weeks after registration for the fall or spring semester. Withdrawal after this period is permitted only in unusual circumstances and requires certification by the instructors of courses for which the student is registered that the student is doing passing work (see Withdrawal, under Regulations).

**Adding Courses**

Courses may not be added after the first two weeks of classes in any semester without the specific permission of the instructor.

**Independent Study Plan**

A junior or senior of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally allowed when a course is taken on a class basis. A petition outlining the student's specific study plan must be submitted to the director of academic advising and student services prior to beginning any independent study.

**Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the director of academic advising and student services, who may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the director.

**Students from Other Schools Within the University**

Degree candidates from other schools of the University cannot register for more than 18 hours of credit in courses from the Bachelor of Accountancy or Bachelor of Business Administration degree programs. Typically, a maximum of 6 hours of credit is permitted in courses from the Bachelor of Accountancy program, unless an advisor recommends an additional 3 credit hours.

**Common Body of Knowledge**

Programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration include the equivalent of at least one year of work in the following areas:

1. A background of the concepts, processes, and institutions in the production and marketing of goods and services and the financing of the business enterprise or other forms of organization.



2. A background of the economic and legal environment as it pertains to profit and nonprofit organizations, along with ethical considerations and social and political influences as they affect such organizations.
3. A basic understanding of the concepts and applications of accounting, quantitative methods, and information systems.
4. A study of organization theory and behavior and interpersonal communications.
5. A study of administrative processes under conditions of uncertainty, including integrating analysis and policy determination at the overall management level.

### **The Bachelor's Degrees**

The School offers programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration. A Bachelor of Business Administration student may elect to develop a field of concentration in business economics and public policy, finance, human resources management, information systems, or international business, or may choose to structure, with faculty approval, a distinctive field of concentration reflecting the student's specific interests in management.

### **Entrance Requirements**

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class include

1. An acceptable certificate of graduation from a U.S. secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra.

International students may be considered for admission with an equivalent foreign secondary certificate. A student presenting a U.S. secondary certificate or its foreign equivalent must also show competence in the English language by scoring not less than 550 on the first taking of the TOEFL or 600 on the second taking. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement. Depending on the results of this test, students may be required to enroll in a full-time program in English before beginning studies in a degree program.

2. Standardized test scores submitted on the Scholastic Aptitude Test, or on the American College Testing battery. In addition, it is strongly recommended that scores on College Board Achievement Tests in English composition and mathematics be submitted. The scores can be used to determine placement in English and mathematics courses. Although no minimum scores are prescribed, test results are an important factor in determining admission eligibility. Students with SAT verbal scores below 500 and SAT math scores below 550, or with ACT composite scores below 25, must show superior performance in their secondary school programs for favorable consideration for admission.

Criteria for admission include a strong high school record and a satisfactory performance on the College Board examinations. It is recommended that the

examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the test. In applying for the test, the applicant should specify that the scores be sent to the Office of Admissions, The George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, P.O. Box 168, Iowa City, Iowa 52243. It is recommended that the applicant take the tests in October of the senior year.

### **Admission With Advanced Standing**

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University, are as follows.

Any student newly admitted to the School of Business and Public Management who is from a country where English is not an official language must take an English as a Foreign Language placement test. Students do not have to take the placement test if they score 600 or higher on the TOEFL. A student failing to pass this examination will be required to complete successfully the appropriate English composition course or courses, and the assignment of credit for any previously completed courses at another institution will be held pending completion of this requirement.

Students who have accumulated fewer than 30 credit hours of transferable, relevant academic credit must have a minimum 2.5 cumulative grade-point average and meet freshman admission standards. Students who have accumulated 30 or more hours of transferable credit must have a cumulative grade-point average higher than 2.5. Advanced standing may be awarded for properly certified courses taken at regionally accredited colleges or universities for which the student received a grade of C or better, and may be applied toward a degree, provided they are comparable to the curricular requirements of the degree. International students who have completed part or all of the English composition requirement, must take a validation examination through the English Department to determine if English advanced standing can be applied toward partial satisfaction of their GW degree requirements.

In no case will more than 60 credit hours of advanced standing be granted for course work completed at regionally accredited community or junior colleges. These 60 hours may include credit granted for completed course work equivalent to SMPP 104 and Mgt 119. Certain courses (one course per area up to a maximum of three courses), comparable to this School's courses numbered 101-200, taken at a regionally accredited community or junior college with an earned grade of C or better, may be accepted for credit only after SMPP 197, *Strategy Formulation and Implementation*, is successfully completed with a grade of C or better in the senior year.

Although a grade of D is not acceptable for transfer of credit, the course may be used to waive a comparable curricular requirement. Credits earned with a D grade may not, however, be counted toward the total number of credit hours required for the degree. Any course completed with a grade of D or better may not be repeated for the purpose of earning degree credit. An exception to this rule is the freshman English composition requirement, Math 31 or 51 (or their equivalents), and all accountancy courses. Any student earning a D in such courses at another institution may be required to repeat the courses at this University.

All credit will be evaluated by the School, which reserves the right to refuse credit for transfer in whole or in part or to allow credit provisionally.



It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, Rice Hall, The George Washington University, Washington, D.C. 20052.

A student wishing to transfer into the School from another division of this University must submit a formal application of transfer to the Office of Admissions in Rice Hall.

Courses taken in another degree-granting division of this University may be applied toward a degree in this School, provided they are comparable to the curricular requirements of the degree. A maximum of 90 credit hours of such credit may be applied toward a degree program in this School. However, in no case will more than 45 credit hours of undergraduate course work taken at this University in nondegree status be allowed toward meeting degree requirements in this School. **Credit for correspondence or home-study courses will not be applied toward a degree in this School.**

### **Degree Requirements**

#### **Academic Work Load**

A full-time student in good standing (2.0 overall grade-point average or higher) may register for a maximum of 15 credit hours each semester and 6 hours each summer session. A student employed more than 20 hours a week, who is in good standing, may not take more than 9 credit hours each semester and 3 hours each summer session. A full-time student on probation may take no more than 12 credit hours of course work. It is strongly recommended that a student on probation not be employed.

A full-time student whose overall grade-point average is 3.5 or higher may take up to 18 credit hours. A student employed more than 20 hours a week, whose grade-point average is 3.5 or higher, may take up to 12 credit hours.

A student who accepts employment after registration or at any time during a semester must report immediately to the director of academic advising and student services so that the program may be adjusted if necessary.

Exceptions to these rules require the approval of the director.

#### **Scholarship Requirements**

A student must have the following to graduate: (1) an overall grade-point average of at least 2.0 and (2) a grade-point average of at least 2.0 in all required 100-level B.B.A. or B.Accy. courses and field-of-instruction-related courses. All courses taken at George Washington University that are acceptable for credit toward the bachelor's degrees are to be included in the overall grade-point average calculation. Elective courses in or out of the School of Business and Public Management cannot be used as substitutes for required courses in the calculation of the major field grade-point average.

#### **Dean's Honor List**

The names of students who achieve a grade-point average of 3.5 or higher are placed on the Dean's Honor List for that semester. Appearance on the list is limited to (1) full-time students registered for a minimum of 12 credit hours (provided that the 12 hours are taken for a grade) and (2) part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

#### **Incomplete/Authorized Withdrawal**

Conditions under which the grades of I (Incomplete) or W (Authorized Withdrawal) may be assigned are described under University Regulations.

The grade of I must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of I is assigned. An Incomplete that is not changed within this period automatically becomes an F. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the director of academic advising and student services for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of I cannot be changed by reregistering for the course here or by taking its equivalent elsewhere. The I notation remains on the student's permanent record **even after the course has been successfully completed.**

The grade of Z (Unauthorized Withdrawal) is assigned when students are registered for a course they have not attended and in which they have done no substantial graded work. The grade of Z is not calculated in the overall and major field grade-point averages.

### **Probation**

A student whose grade-point average (either overall or in the major field) falls below 2.0 after completing a minimum of 12 credit hours of study will be placed on probation. Probation by overall grade-point average extends over the period in which the student attempts another 12 credit hours of work, which may include remedial studies as prescribed. A student's program may be further restricted by the director of academic advising and student services, if deemed necessary. During this period the student's performance will be monitored to determine suitability for continued study. Please note that Incomplete grades are not allowed during the probation period. Probation by major field extends over the period in which the student attempts 6 credit hours of study in major field course work.

### **Suspension**

A student whose grade-point average (either overall or in the major field) is 1.5 or below in any semester or remains below 2.0 at the end of the probationary period will be suspended. Any outstanding Incomplete grade at the time of suspension will be completed or will turn to an administrative F. A student suspended for poor scholarship may apply for readmission after the end of the fall or spring semester following the date of suspension. To be considered for readmission, the student must submit evidence of remedial activity performed during the suspension period and evidence of renewed potential ability to do college-level work. No advanced standing will be assigned for academic work completed while the student is suspended, but the student may petition the director of academic advising and student services for consideration of advanced standing after completing a minimum of 12 credit hours of course work here and achieving a **cumulative and major field grade-point average of at least 2.0.**

A student readmitted after suspension is on probation and must maintain a current grade-point average of at least 2.5 for each 12 credit hours of work undertaken until the cumulative and major field grade-point average are at least 2.0. In no case will the overall probationary period after readmission exceed 24 credit hours of study or the major field probationary period exceed 12 credit hours of study. A student suspended twice for poor scholarship will not be readmitted.

### **Pass/No Pass Option**

A junior or senior student who has a cumulative grade-point average of 2.5 or better may, with the approval of the advisor and the director of academic advising and student services, take one course a semester and receive a grade of P, Pass, or



NP, No Pass, which will be recorded on the student's transcript but will not be reflected in the grade-point average. No student will be allowed to take more than four pass/no pass courses, with a limit of one per semester. A student must sign up for such an option at registration. Under no circumstances may a student change from pass no pass status to graded status, or vice versa, after the last date to drop a course (except in the case of a prerequisite to Math 51). Required courses may not be taken on the pass no pass basis. A transfer student may not choose this option until the second semester of enrollment in the University.

### Grade of F

A grade of F earned in a required or elective course remains a part of the student's record and is calculated into the grade-point average.

### Residence

A minimum of 30 credit hours, including at least 12 credit hours in required B.B.A. or B.Accy. courses, must be completed while registered in the School of Business and Public Management. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the director of academic advising and student services to pursue work elsewhere, the work of the senior or final year must be completed in the School of Business and Public Management.

### Earning Credit or Waiving Requirements by Examination

A student may earn credit up to a maximum of 30 credit hours or waive curricular requirements by performing satisfactorily on the following tests:

**College-Level Examination Program (CLEP)**—See Admissions for general information on the CLEP tests. CLEP tests in Introduction to Business, Commercial Law, and Data Processing are limited to 3 credits each of advanced standing. CLEP tests in general mathematics, college algebra trigonometry, English composition, and more advanced courses in accounting and business administration are not accepted for advanced standing. Matriculated students who wish to receive credit for CLEP General and Subject Examinations must receive prior approval, through petition, of their advisor and the director of academic advising and student services.

**Advanced Placement Tests and Achievement Tests**—See Admissions.

**Examinations for Waiving Curriculum Requirements**—The School of Business and Public Management does not administer waiver examinations. However, certain arts and sciences courses may be waived, and in some instances credit may be assigned, by satisfactorily passing a special departmental examination approved by the department or designated advisor. Requests to take the examination should be made to the director of academic advising and student services and the required fee paid at the Office of the Cashier before the date set for the examination.

### The Bachelor of Accountancy

The principal objective of the Bachelor of Accountancy degree is preparation for a professional career in accounting. Professional preparation requires specialization in the acquisition of accounting knowledge as well as a general education in English, humanities, social sciences, mathematics, and sciences. A common body of knowledge in business administration is taken, with emphasis on the accounting program. An additional objective is the preparation of students for a fifth-year or Master of Accountancy program that is intended to meet the academic needs of students seeking professional accounting careers in the public or private sector, which currently demand high entry-level academic achievement.

One hundred twenty credit hours are required for graduation. To be accepted in the Bachelor of Accountancy program a cumulative grade-point average of 2.5 or higher is required at the start of the junior year. Courses must be taken in accordance with the academic status of the student (i.e., freshman, sophomore, junior, senior) and the course prerequisites. Math 3, 6, 9, 10, 12, and 13 may not be used for credit toward the Bachelor of Accountancy.

#### **Curriculum for the Pre-Accountancy Program**

**Freshman Year**—Econ 11–12; Engl 9 or 10, 11; Math 31–32 or 51–52; PSc 2; Soc 1; a two-course sequence chosen from BiSc 3–4, Chem 3–4, Geol 1–2, Phys 9–10.

**Sophomore Year**—Accy 51–52; Econ 121; Psc 1; Phil 45 or 51, and 135; Stat 51; Comm 111; Mgt 58; one 3-credit course chosen in consultation with the Department of Accountancy.

#### **Curriculum for the Accountancy Program**

**Junior Year**—Accy 101, 121, 151, 152 or 162, 161, 191; Fina 120; MLOM 140; SMPP 191; Engl 102.

**Senior Year**—Accy 132, 171, 181; Mgt 107 or 110; IBus 160 or 166 or 171; MLOM 188; SMPP 101, 197 (SMPP 197 must be taken at GW); Stat 103; one 3-credit elective chosen from courses offered by Columbia College or the School of Business and Public Management.

#### **The Bachelor of Business Administration**

One hundred twenty credit hours of course work are required for graduation. To be recommended by the Faculty for graduation, candidates are required to complete, in addition to the appropriate freshman and sophomore work, a minimum of 60 credit hours of course work in the junior and senior years selected from one of the fields of concentration offered by the School. Courses must be taken in accordance with the academic status of the student (i.e., freshman, sophomore, junior, senior) and the course prerequisites. The field of concentration must be selected no later than the first semester of the junior year. Electives in the junior and senior years are restricted to appropriate 100-level courses chosen in consultation with the advisor. Math 3, 6, 9, 10, 12, and 13 may not be used for credit toward the B.B.A. degree. If the student places in the first semester of a language previously studied in high school, credit toward the degree will not be granted; however, the second semester of a first-year language course that was studied in high school may be taken as a sophomore elective.

Incoming freshmen may choose a B.B.A. program with an international business field and a world area focus on Latin America, the Pacific Rim, or Europe. Students in these programs take the same business core requirements as all other B.B.A. students. Their interest in a particular world area, however, is enhanced through a selection of general education requirements that provide historical and cultural background on that area of the world and a language proficiency requirement in a language relevant to the focus area. A student may need to take an additional 4 to 10 hours over and above the 120 hours for the standard program in order to complete this international program. Interested students should speak to an advisor in the Office of Academic Advising and Student Services.

#### **Curriculum for the First Two Years for All B.B.A. Students**

**Freshman Year**—Econ 11–12; Engl 9 or 10, 11; Math 31–32 or 51–52; a two-course sequence chosen from BiSc 3–4 or 11–12, Chem 3–4 or 11–12, Geol 1–2, Phys 1–2 or 9–10; a two-course sequence chosen from AmCv 71–72, Anth 1–2, Geog 1, 2, or 3, Hist 39–40 or 71–72, PSc 1–2, Soc 1–2.



**Sophomore Year**—Accy 51–52; SMPP 51; Mgt 58; Psyc 1; Stat 51 or 53; a two-course sequence chosen from Art 31–32 or 71–72; Chin 3–4; Clas 71–72; Engl 51–52, 61–62, or 71–72; Fren 2–3; Ger 3–4; Ital 2–3; Mus 3, 4; Phil 45, 51, 52, or 71; Rel 1, 2, 9, 10, or 23; Slav 3–4, 5–6, or 91–92; Span 2–3; Comm 1, 111, or 112; or SpHr 11; two 3-credit electives chosen from courses other than accountancy, economics, finance, international business, management science, strategic management and public policy, and marketing, logistics, and operations management.

### Curriculum for the Second Two Years for All B.B.A. Students

The Bachelor of Business Administration program is designed to provide the broad foundation required for eventual leadership in either business or governmental administration. The business administration major consists of 33 credit hours of required general business administration courses and 15 hours of required field-related courses. Twelve hours of electives, normally advanced courses in liberal arts subjects, are required, but are not included in the calculation of the major grade-point average.

**Junior Year**—Mgt 110; Fina 120; MLOM 140; SMPP 191; Econ 121; one course chosen in consultation with the advisor from Accy 101, 111, 121, 161; two courses selected from the chosen major field; two 3-credit electives chosen in consultation with the advisor.

**Senior Year**—SMPP 101, 104, 197 (SMPP 197 must be taken at GW); MLOM 188; Psyc 144 or Mgt 107 (students in marketing substitute MLOM 142); three courses selected from the chosen major field; two 3-credit electives chosen in consultation with the advisor.

The field of concentration must be selected no later than the first semester of the junior year. The student should contact the office of Academic Advising and Student Services to declare a field. In addition to maintaining the current advisor, the student is assigned a faculty mentor. Fields are described below (an asterisk indicates that the course is required for the field).

**Business Economics and Public Policy**—This field is directed toward developing understanding and skills applicable to a wide variety of positions in business and public-sector organizations. The social, legal, political, and economic environment of business and the micro- and macroeconomic foundations of governmental programs and regulatory activity are studied to establish a basis for developing and evaluating effective business responses. The program is concerned with the continuing business-government dialogue on effective and equitable relations between the two sectors of society.

The following courses provide a basic academic foundation in the field of business economics and public policy: Mgt 117; IBus 171; Econ 101,\* 102,\* 136, 158, 159, 161, 162, 181–82; PSc 116, 117, 118; PAd 125.

**Finance**—This field helps students develop the skills required for entry-level employment in corporations, financial institutions, and the public sector. Corporations employ entry-level finance specialists for cash, credit, or inventory analysis or management and for work in bank relations and capital budgeting. Financial institutions offer opportunities for entry-level finance specialists to analyze specific securities and to assist in loan analysis. The government sector looks to finance students as potential financial analysts. The field also provides an excellent foundation for graduate work, especially the study of law.

The following courses provide a basic academic foundation in the field of finance: Accy 111 or 121; Fina 123,\* 124,\* 130, 132 or 133, 135; IBus 171.

**Human Resources Management**—This field is concerned with all aspects of the employment of human resources in business organizations. Entry-level career opportunities are in such fields as personnel management, employee relations,

collective bargaining, and manpower utilization. The field offers increasing professional opportunities in a post-industrial society, where the costs of employees are increasing, the expectations of people are expanding and becoming more diverse, and the regulatory environment is becoming more complex. Since the field focuses on the management of human resources in a general sense, it also prepares the student for responsibilities associated with general management and leadership.

The following courses provide a basic academic foundation in the field of human resources management: Mgt 115,\* 117\*; Comm 121; Jour 145; Psyc 129, 131.

**Information Systems**—Students taking this field develop a firm foundation in the use of the computer as a tool in solving information problems in organizations and are recruited by public and private sector organizations for positions as programmer/analysts and systems designers. These entry-level positions lead to careers in the marketing of computer hardware and software, systems consulting, and management.

The following courses provide a basic academic foundation in the field of information systems: CSci 131, 141; Mgt 119,\* 120,\* 121,\* 122\*; Stat 130, 131.

**International Business**—This field provides the basic academic foundations for entry-level positions in international business, particularly in multinational corporations, international banks, and government agencies. Such organizations include the Departments of Commerce, State, and Treasury, plus international institutions such as the Export-Import Bank, World Bank, and Overseas Private Investment Corporation. Students in this field are encouraged to include two years of a modern foreign language in their preparatory background.

The following courses provide a basic academic foundation in the field of international business: Fina 123, 135; IBus 160,\* 166,\* 168, 171,\* 173, 175; MLOM 143, 148, 150, 182; Econ 181-82; TrSd 104.

**Marketing**—This field provides understanding of complex and changing environments and their effects on marketing activities and institutions; dynamics of buyer behavior; demand, market segments, and cost-volume profit relationships of marketing programs; and skills in formulating and implementing comprehensive marketing plans. Typical entry-level positions are advertising account executives, marketing research project managers, retail assistant buyers, and sales representatives for consumer or industrial products firms.

The following courses provide a basic academic foundation in the field of marketing (please note that MLOM 142 cannot be used as a field of instruction related to the individual field. All such individualized fields must be approved in advance by the Undergraduate Program's Faculty Advisory Committee. Interested students should discuss their ideas with an advisor.

### Individualized Field of Concentration

A student with interests in a specific field of management may elect to structure an individual field of concentration. Such a concentration would consist of five upper-level courses chosen from among the offerings of the School or University related to the individual field. All such individualized fields must be approved in advance by the Undergraduate Program's Faculty Advisory Committee. Interested students should discuss their ideas with an advisor.

### Secondary Field of Study

A secondary field of study in business administration is available in the School of Business and Public Management. See the brochure "Secondary Fields of Study," available in the Office of Academic Advising and Student Services.



## **SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT**

Dean P.P. Smith

Associate Deans J.C. Heddesheimer, R.N. Ianacone

### **Introduction**

The School of Education and Human Development prepares teachers, human service and service industry personnel, resource and support personnel, and administrators for professional service. The School's programs address the preparation of individuals for all areas of education and human development, covering the life span from pre-school through the adult years, in both the public and private sectors of society. While most programs are offered at the graduate level, two degree programs are available to undergraduates: the Bachelor of Human Services and the Bachelor of Science in Exercise and Sport Science.

Undergraduate programs provide opportunities for students to develop a foundation in the liberal arts, critical thinking and reasoning, as well as leadership, organizational, and planning skills. Emphasis is placed upon developing the human relationship qualities that are essential in fields that require involvement with people in all age ranges and from all walks of life.

The School of Education and Human Development offers fully accredited and state approved teacher certification preparation programs at the graduate level. Several fields are available within elementary, secondary, and special education. Special curricula are tailored on an individual basis for liberal arts graduates and graduates of other professional schools who are interested in teaching or in other human services areas. The School also offers a wide range of courses for teachers who wish to renew licenses and for provisional teachers who wish to prepare for teaching certificates. See the Graduate Programs Bulletin.

The School of Education and Human Development is the administrative unit for four departments: Educational Leadership, Exercise Science and Tourism Studies, Human Services, and Teacher Preparation and Special Education.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

### **The Bachelor's Degrees**

The School of Education and Human Development offers undergraduate programs leading to the degrees of Bachelor of Human Services and Bachelor of Science in Exercise and Sport Science.

### **Entrance Requirements for Freshmen and Sophomores**

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman and/or sophomore years are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college-preparatory mathematics.
2. The principal's statement that the applicant is prepared to undertake college work.

3. Standardized test scores submitted on College Board Achievement Tests in English composition and mathematics and on the Scholastic Aptitude Test, or on the American College Testing battery.

It is recommended that the College Board examinations be taken in December or January of the senior year. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the tests. In applying for the tests, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

The School of Education and Human Development will consider the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not meet all of the formal requirements stated above. The School may require appropriate scholastic aptitude tests. Students admitted with deficiencies in secondary school units will be required to begin removing such deficiencies within the first year, by appropriate courses or examinations.

International students may be considered for admission with an equivalent foreign secondary certificate. A student presenting such a certificate must also show competence in the English language and may be required to enroll in a full-time program in English as a Foreign Language before beginning studies in a degree program. Requirements will be determined on the basis of an English Proficiency Test administered on campus. A candidate who submits a score of 580 or above on the Test of English as a Foreign Language (TOEFL) may be excused from taking further course work in English as a Foreign Language but will be required to take the English Placement Examination on campus.

Students who have been out of secondary school for three years or more or do not meet the above requirements may take a special battery of admission tests by contacting the Office of Admissions or may be considered for provisional admission to the School of Education and Human Development. A student admitted provisionally is required to complete a trial program of 15 credit hours of course work with a grade-point average of 2.5 or higher. The selection of courses to be taken in the trial program must be made in conference with a faculty advisor.

All undergraduates admitted directly to the School of Education and Human Development are assigned academic advisors at the time of admission. Advisors are designated to provide continuity of advising for students throughout their years of undergraduate study. The program for each student must be approved by a faculty advisor.

### **Admission With Advanced Standing**

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows.

Students who have accumulated 15 hours or more of academic credit at another regionally accredited college or university with an acceptable program and acceptable grades may be admitted to the School of Education and Human Development as transfer students with advanced standing. Such transfer students must have a grade-point average of 2.25 or better for college course work and must meet freshman requirements. Advanced standing may be awarded for properly certified courses for which the student received a grade of C or better, provided that such courses are comparable to the curriculum requirements of the degree at GW. In the case of course work from a two-year college, no more than 60



to 63 credit hours of credit may be applied as advanced standing toward the total number of credit hours required for the bachelor's degree.

Although a grade of D in a course is not acceptable for transfer, the course may be used to satisfy a curriculum requirement. Credits earned with a D grade may not, however, be counted toward advanced standing.

The School reserves the right to refuse credit for transfer in whole or in part or to allow credit provisionally.

It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students may transfer from another division of this University into a degree program in the School of Education and Human Development. The student must present an accumulated grade-point average of 2.25 or higher to be considered for transfer and must submit a formal application of transfer to the Office of Admissions.

Students applying for transfer from another accredited college or university or from another division of this University, who do not meet the formal requirements for admission with advanced standing or whose previous academic records raise doubts of their ability to complete degree requirements successfully, may be provisionally admitted to the School of Education and Human Development. To be admitted into the School's degree program, a provisionally admitted student must complete a prescribed trial program of 15 credit hours of course work with a grade-point average of 2.5 or higher.

The selection of courses to be taken in the trial program must be made in conference with a faculty advisor. A conference concerning plans for study as a degree candidate is required of each applicant at the beginning and end of the trial program. Upon successful completion of the trial program, the student who has submitted a degree-candidate application will be advanced to degree status.

Nurses filing for admission to the bachelor's program in human services are required to submit a copy of their current state nurse's registration (license) in addition to the official transcripts. Nurses may be awarded advanced standing for work completed in a community or junior college program. They may also receive advanced standing of up to 45 credit hours for course work completed as part of a three-year nursing diploma program in a teaching hospital. Graduates of associate's degree nursing programs may be awarded advanced standing of up to 63 credit hours.

### **General Scholarship Requirements**

Regulations regarding academic standing, probation, suspension, withdrawal, classification of students, required placement examinations, and waiving introductory courses by examination are the same as those for Columbian College; see Columbian College and Graduate School of Arts and Sciences.

### **Academic Work Load**

Fifteen to 17 credit hours constitute a normal program. A student with a grade-point average of 3.0 or higher may, with the permission of the dean, enroll for 18 or 19 hours. No student may enroll for more than 19 hours, except by permission of the dean. Check with the office of the dean for information on the number of hours a student may be employed in relation to the number of credits that may be taken.

### **Placement Examinations**

Many departments in Columbian College, including English, Mathematics, and all foreign languages, require students to take placement tests to determine level of proficiency or eligibility for specified courses. The student is placed in an

appropriate course on the basis of these tests. There is no charge to the student for placement tests, and no credit (advanced standing) is awarded for courses bypassed or waived as a result of these tests.

### **Earning Credit by Examination**

Undergraduate students may earn credit up to a maximum of 30 hours by performing satisfactorily on College-Level Examination Program (CLEP) tests or special departmental examinations provided by the departments of Columbian College on an individual basis. Passing a waiver examination does not entitle the student to any credit hours of credit in the School of Education and Human Development. A limited amount of credit may be assigned for selected service school instruction.

### **Requirements for the Degrees**

To be recommended for a degree, a student must satisfy the admission, residence, scholarship, and curriculum requirements. The amount of course work required for bachelor degrees is as follows:

*Bachelor of Human Services*—120 credit hours

*Bachelor of Science in Exercise and Sport Science*—124 credit hours

Candidates for the bachelor's degrees must complete satisfactorily a minimum of 30 credit hours in the School of Education and Human Development.

### **Dean's List**

To be eligible for the Dean's List a full-time student must obtain a grade-point average of 3.5 on courses completed during the past semester. A part-time student, to be eligible, must obtain a grade-point average of 3.5 on the last 12 credit hours of course work within one academic year. Such part-time students must be in residence and must be continuously enrolled.

### **Scholarship Requirements**

For the system of grading and of computing scholarship, see *Scholarship Requirements under University Regulations*.

In order to graduate, a student must have a grade-point average of at least 2.25.

**Probation**—A student who fails to maintain a grade-point average of at least 2.25 is placed on probation. The student remains on probation as long as the grade-point average is below 2.25 or until probation is removed by the Student Committee.

**Suspension**—A student on probation who fails to raise the grade-point average to 2.25 within the time specified may be suspended.

A student suspended for poor scholarship may, within 10 days, appeal the case through the dean to the Student Committee. If the case appears to be remediable and the student's scholarship seems likely to improve, the Committee may readmit the student on probation. A student denied readmission may again, after a lapse of a calendar year, petition the Committee through the dean for readmission. A student suspended twice will not be readmitted.

### **Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the dean.



### Curriculum Requirements

In all bachelor's curricula at least 60 credit hours must consist of courses numbered above 100 or the equivalent in transfer credits.

#### Pass/No Pass Option

A junior or senior student who has a cumulative grade-point average of 2.5 or better may, with the approval of an advisor and the dean, take one course a semester and receive a grade of *P* (Pass) or *NP* (No Pass), which will be recorded on the student's transcript but will not be reflected in the student's grade-point average. No student will be allowed to take more than four pass/no pass courses. Students must sign up for such an option at registration. Students may change from pass/no pass status to graded status, or vice versa, after the end of registration only with the permission of the dean and the course instructor. Courses required in the student's major field may not be taken on the pass/no pass basis. A transfer student may not choose this option until the second semester of enrollment at this University.

#### Incomplete/Authorized Withdrawal

Conditions under which the grades of *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described under University Regulations.

**Changing an Incomplete**—When a grade of *I* is assigned, the instructor should normally set a period within which the uncompleted work (usually the final examination or a required paper) must be made up. When required work has been completed, it is the responsibility of the instructor to change the grade of *I* as appropriate. If work is not completed, the instructor will decide whether to change the grade of *I* to *F* or to allow the *I* grade to remain. The grade of *I* cannot be changed by reregistering for the course here or by taking its equivalent elsewhere.

### Bachelor of Human Services

The Human Services Program is designed for persons who wish to work in the following representative types of human service areas: hospitals and health care agencies, residential centers, cultural institutions, substance abuse rehabilitation programs, correctional institutions, and voluntary agencies. Graduates are prepared for entry level positions in the human services or to continue with graduate studies in fields such as social work, counseling, rehabilitation services, or one of the many other human service areas.

The program includes a core of course work in the human services, fieldwork experiences in diverse human services settings, and an academic concentration. Each program is individually planned after evaluation of the student's professional and educational background and long-range goals.

Students planning to major in human services take the following courses: Engl 9 or 10, 11, 51–52 or 71–72; Comm 1, 121; one course chosen from Math 9, 10, or 12 or Stat 51 or 53 (with approval of advisor another course in analytical thinking may be substituted); BiSc 3–4 or an alternative approved science sequence; 27 credit hours of courses in the social sciences that have been approved by the advisor, including a course in professional ethics and at least 6 hours of history or political science and 9 hours of anthropology and/or sociology; 6 hours of electives. The core program consists of 36 credit hours, including HmSr 171, 172, 176, 182, 195; SLP 152; and 15 additional hours in selected with approval of the advisor. The concentration consists of 24 credit hours selected from rehabilitation services or a secondary field of study in an area such as psychology or sociology.

**Bachelor of Science in Exercise and Sport Science**

The Bachelor of Science in Exercise and Sport Science program is being revised as this Bulletin is prepared for press. Please check with the School of Education and Development for program requirements.

**Secondary Fields of Study**

The School of Education and Human Development offers secondary fields of study to students enrolled in other schools of the University. Secondary fields are available in exercise and sport science, human services, and early childhood education. Specific information can be found in the brochure "Secondary Fields of Study," available in the office of the dean.





## SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Dean G. Frieder

Acting Associate Dean R.M. Soland

### Introduction

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbian University. It was named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering. The organization and offerings of the school have changed several times over the years, but throughout most of its history the program has been characterized by its emphasis on principles rather than technology.

Through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management; Operations Research—the School of Engineering and Applied Science offers undergraduate study leading to the degrees of Bachelor of Science (Civil Engineering), Bachelor of Science (Computer Engineering), Bachelor of Science (Computer Science), Bachelor of Science (Electrical Engineering), Bachelor of Science (Mechanical Engineering), and Bachelor of Science (Systems Analysis and Engineering). The School offers graduate study leading to the degrees of Master of Science, Master of Engineering Management, and Doctor of Science and to the professional degrees of Engineer and Applied Scientist.

The School of Engineering and Applied Science maintains extensive and varied computing facilities as well as an array of laboratory facilities to support study and research in such areas as general-purpose electronics, computer science, graphics, computer-aided design, robotics and computer-aided manufacturing, computer-aided engineering, artificial intelligence/software engineering, decision support systems, human factors, communications research, power systems, control systems, medical engineering, combustion diagnostics, fluid mechanics and hydraulics, environmental engineering, propulsion, soil mechanics, thermal sciences and instrumentation, thin-film development, and communications, microwaves, and lasers.

### Entrance Requirements

#### Entering Freshmen

Consideration for admission is based on the following: (1) an acceptable certificate of graduation from an accredited high school showing at least 16 units (a unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work); (2) scores on the College Board Scholastic Aptitude Test (SAT) or on the American College Testing (ACT) battery; (3) high school grades; (4) class standing. Although no minimum scores are prescribed, test results are considered in determining admission eligibility. Students whose combined SAT scores are below 1100 (600 mathematics) or whose ACT composite scores are below 27 (28 mathematics) must show superior academic performance in their high school programs in order to be accepted for admission. In addition, although College Board Achievement Tests in English composition and mathematics are not required for admission to the School of Engineering and Applied Science, it is recommended that applicants submit scores on these tests.

Twelve of the 16 units required for admission must be distributed as follows: four in English; four in mathematics, including two in algebra, one in plane geometry, one-half in trigonometry, and one-half in precalculus, analytical geometry, or functions; one in physics; one in chemistry; and two in history or a

foreign language. General science courses do not satisfy the science requirement but may be counted as elective units.

Applicants who do not meet the above requirements may be considered by the School, but additional mathematics or English placement tests may be prescribed.

A graduate of an approved high school who lacks not more than two units (only one of which may be a mathematics or science requirement) of the required subjects and who presents 16 acceptable units may be admitted to a prescribed program that includes courses to make up the deficiencies.

See Admissions for additional requirements for students from foreign institutions.

### **Transfer Students**

To be considered for admission as a transfer student, an applicant must be in good standing as to scholarship and conduct at all postsecondary institutions previously attended and should have a minimum grade-point average of 2.7 on a 4.0 scale. A student who has been academically dismissed will not normally be considered for admission.

When no duplication is involved, either through course work or examination, transfer credit may be granted for work successfully completed at other accredited institutions of higher learning. Credit will be granted only when such work meets the requirements for the degree sought at this University. Courses graded D, or the equivalent, or lower will not be considered for transfer.

Although there is no strict limit to the total amount of transfer credit that may be assigned, a student must satisfy the 30-credit-hour residence requirement and course requirements for the degree sought at George Washington University. Students should complete a Transfer of Credit worksheet, available in the SEAS Office of Student Services, and present the worksheet to their advisor for final approval.

### **Admission with Advanced Standing**

#### **Credit by Examination**

Assuming there is no duplication of course work, a maximum of 30 credit hours may be assigned upon admission to the University for any combination of the following.

*College Board Advanced Placement (AP) Tests*—See Admissions.

*College Board College-Level Examination Program (CLEP)*—See Admissions.

A student already registered at the University must seek departmental approval before taking a CLEP Subject Examination for credit. Credit may not be earned by passing the examination after having taken the equivalent course or after having taken a waiver examination for the course.

*Department Examinations for Waiver or Credit*—Registered SEAS students may also take examinations in some academic departments for waiver of or credit for a specific course upon approval of the appropriate department chair; before the test is administered, the student must have demonstrated sufficient preparation to warrant being given the test. An examination for credit is not allowed if an examination for waiver has been successfully completed or if the student has taken the course.

#### **Makeup of Credit for Waived Courses**

If a course required by the engineering curriculum is waived, the corresponding credit hours must be earned by satisfactory completion of a university-level academic course, either technical or nontechnical, approved by the student's faculty advisor or department chair. If the substituted course would normally be considered part of the student's curriculum, the grade earned will be used in



determining grade-point average, Dean's List, probation, and suspension. If the substituted course is not part of the student's curriculum, the grade will not be included in the above computations.

### **Credit from Service Schools**

A limited amount of credit may be assigned for selected service school courses.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

### **Attendance**

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.

### **Academic Work Load**

A full-time undergraduate student who is not on probation may register for no more than 21 credit hours. Students on probation may not register for more than 12 credit hours. A student employed more than 24 hours a week may take no more than 10 credit hours. In exceptional cases these limits may be exceeded with the advisor's permission.

### **Changes in Program of Study**

A student may not make any changes in an approved program of study without the consent of the faculty advisor and the associate dean. Requests for changes in class registration must be made on a program adjustment form, available in the SEAS Office of Student Services.

**Adding Courses**—During the first 14 days of the semester, courses may be added to the student's program by submitting a program adjustment form with the necessary signatures.

**Dropping Courses**—Courses may be dropped without academic penalty during the first 28 days of the semester by submitting a program adjustment form with the necessary signatures.

**Late Drop**—Permission to drop a course without academic penalty after the 28th day of a semester may be granted with the approval of the instructor, the student's advisor, the chair of the department in which the student is enrolled, and the associate dean. Requests for late drops must be submitted to the associate dean's office on the appropriate late-drop form and must be accompanied by a program adjustment form and certification of sickness or injury, if such is the cause of the late withdrawal. A late drop may be granted only under both of the following conditions: (1) it is necessary because of exceptional circumstances, such as certified medical absence or forced absence caused by work-related requirements; (2) the grades in all courses involved are D or better as of the date of the request.

In all cases, financial regulations governing withdrawal remain in full effect.

**Change in Course Status**—The status of a course may not be changed from credit to audit or vice versa after the 28th day of the semester.

### **Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the associate dean. The associate dean may assign supplementary work, without academic credit, varying with the needs of

the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the associate dean.

### **Scholarship Requirements**

To be eligible for graduation a student must have (1) a grade-point average of at least 2.2 for technical courses taken in the fifth through eighth semesters of the curriculum and (2) a 2.0 overall average for the engineering program taken at SEAS.

Grades discussed in the sections below include all grades earned at George Washington University and through the Consortium universities while the student is enrolled at GW. The grades considered are for academic courses taken in fulfillment of degree requirements and not for remedial courses or those taken to make up deficiencies. (For example, EFL courses numbered 45 and below will not be considered for purposes of probation, suspension, or Dean's List.)

Social science, humanities, or technical elective courses taken in excess of the number needed to fulfill the requirements in these areas (including graduate-level courses) are not considered in determining probation, suspension, graduation, or Dean's List status. Only those courses initially taken to meet the requirements will be included in these determinations.

### **Probation**

A full-time student will be placed on probation if his or her grade-point average is less than 2.0 for one semester or if he or she receives more than one grade of F in one semester or summer session. A part-time student will be placed on probation if his or her grade-point average is less than 2.0 or he or she has received more than one grade of F when he or she has accumulated 12 credit hours. For academic purposes, a new grading period will begin once this accumulation is reached.

A student on probation who receives a grade-point average of 2.0 or better (for 12 or more credit hours) during the semester on probation but also receives a grade of F will be placed on continued probation. Students in this category who receive two Fs will be suspended.

A full-time student will be removed from probation when his or her engineering curriculum grade-point average is 2.0 or more with no grade of F during the semester on probation. A part-time student will be removed from probation when his or her engineering curriculum grade-point average is 2.0 or more and he or she receives no grade of F for the next 12 credit hours after being placed on probation.

### **Suspension**

The following cases constitute grounds for suspension: (1) receipt of two grades of F any time during a probation period (part-time students receiving two grades of F while on probation will be suspended at the time of receipt of the second of these grades); (2) placement on probation in two consecutive semesters (or the equivalent for part-time students); (3) receipt of four grades of F in any semester (or the equivalent for part-time students); (4) placement on probation for a third time, whether or not the probation periods are consecutive; (5) accumulation of a grade-point average of (a) 1.5 or less at the end of the sophomore year or upon completion of the 63rd credit in the student's curriculum, (b) 1.9 or less at the end of the junior year or upon completion of the 97th credit in the student's curriculum, or (c) less than 2.0 at any time during the senior year.

Department faculty may designate additional courses to be taken and grades to be received by students who fail to meet but come close to meeting the gradua-



tion requirements. Suspension may be held in abeyance until the conditions are or are not met.

Students admitted on probation will be suspended if they do not attain a minimum grade-point average of 2.0 during their first semester (12 or more credit hours) or if they receive more than one grade of F during the period.

Once suspended, a student may not have that suspension rescinded by a grade change at a later date. The student may, however, apply for readmission noting the grade change. Students who have been suspended may not apply for readmission until one year after the suspension. To be considered for readmission, a student must have undertaken academic work at another institution, primarily in mathematics, science, or engineering, during the year of suspension and earned a grade-point average of at least 2.7.

### **Midsemester Warning**

At the end of the seventh week of each semester, instructors are expected to report to the dean the name of any student whose scholarship is unsatisfactory. On receipt of a warning notice, a student must consult with the appropriate instructor and faculty advisor immediately. The advisor may prescribe diagnostic tests or remedial study, or both, to be completed before the end of the semester.

### **Dean's Honors and Commendation Lists**

The names of all students who, in a given semester, take 12 or more graded credit hours in course work that applies to graduation requirements may appear on the Dean's Honor List if a grade-point average of 3.5 is achieved or on the Dean's Commendation List if a grade-point average of 3.0 is achieved. No disciplinary action may have been taken against the student, and no more than one grade of C and no grades below C- may have been earned.

The grades used to compute the grade-point average that determines eligibility for the Dean's Honors and Commendation Lists are those used to meet the SEAS graduation requirements. A student who receives a grade of I (Incomplete) during a semester will not be placed on the Dean's Honors or Commendation List for that semester unless the I is removed no later than 30 days after the end of the marking period and the student continues to meet all the requirements for the Dean's Honors or Commendation List.

### **Incompletes**

Conditions under which the grade of I (Incomplete) may be assigned are described under University Regulations. If a grade of I is not changed to a letter grade within 30 days, decisions on probation, removal from probation, and suspension will be made with the information on hand, in conformance with SEAS regulations.

Although the grade of I may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The grade of I cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. A grade of I that is not removed after one calendar year will be changed on the permanent record to a grade of F. A course in which a student receives an F in this way must normally be repeated. The grade to which the I is changed will be applied to the grade report for the semester or summer session during which the change is made for the purposes of determining probation, suspension, grade-point average, and Dean's and other honor lists.

### **Pass/No Pass Grading System**

Excluding EngS 1-2, SEAS students may not take courses required for graduation on the pass-no pass (P/NP) grading system. They may, however, take courses outside their regular engineering academic program under this grading system.

Students whose status of probation or suspension depends on a grade of P are given 30 days to have the grade changed. If not changed by the end of that period, the P will be considered a C for probation, suspension, Dean's List, and graduation purposes, and a grade of NP will be considered an F.

### **General Curriculum Requirements**

Bachelor of Science programs require the following number of credit hours for completion of the degree: Civil Engineering, 135; Computer Engineering, 137; Electrical Engineering, 133 (premedical engineering option, 140); Mechanical Engineering, 135; Systems Analysis and Engineering, 134. Thirty hours must be completed in residence. Full-time students normally complete their programs in four years. The core curriculum—the program of the first four semesters—is largely similar across curricula, providing the base of scientific principles and mathematical techniques necessary for the professional courses taken in the last four semesters.

### **Advisory System**

Every entering undergraduate student is assigned a faculty advisor to assist in orientation in the professional discipline. Faculty advisors counsel students on their programs of study, achievement and maintenance of satisfactory scholastic performance, professional development, and extracurricular activity as part of the educational process. The advisor represents the student in all cases requiring faculty action.

Students must obtain their advisors' approval of programs of study prior to registration for each academic semester and summer session. Until the work required for the degree is completed, students must consult with their advisors in all academic matters. However, an advisor may not deny entry into any course or activity to which the student is entitled under the regulations of the School.

### **Courses in the Humanities and Social Sciences**

With the assistance of his or her advisor, each engineering student prepares a program of elective courses in the humanities and social sciences. The program must include a minimum of 18 credit hours, divided equally between the two disciplines. Further, each 9-hour group must include 6 hours, or a two-course sequence, in one subject area. The advisor and the department chair must approve the program.

Since the engineering curricula are, by necessity, oriented toward technical subjects, the program in the humanities and social sciences should consist of courses that broaden the student's outlook. Courses in areas such as anthropology, economics, foreign languages, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

### **Civil Engineering**

Civil engineering encompasses those branches of engineering most closely related to the control and improvement of our environment and of the physical conditions of life. Civil engineers apply many technical specialties in order to plan, design, and construct projects that range from buildings and transportation systems to space stations and space habitats.



### Core Curriculum

*First Semester*—CSci 50; Engl 9 or 10; EngS 1; Math 31; Phys 13; humanities or social science elective.

*Second Semester*—Chem 13; EngS 2, 4; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 57, 113, 115; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 58, 114; CE 120, 140; Phys 16; humanities or social sciences elective.

### Civil Engineering Curriculum

*Fifth Semester*—CE 117, 121, 166, 167; ME 126, 131.

*Sixth Semester*—CE 122, 192, 193; Geol 136; humanities or social sciences electives (6 hours).

*Seventh Semester*—CE 168, 190, 191, 194, 195; technical elective selected from list below.

*Eighth Semester*—CE 182, 185, 196, 197; technical electives (8 hours); EMgt 160 is strongly recommended.

**Technical Electives**—ApSc 199; CE 198, 201, 202, 203, 204, 205, 206, 208, 210, 212, 213, 214, 216, 219, 220, 223, 240, 241, 243, 254, 255, 266, 282, 284; EMgt 160; EngS 215, 231, 234, 237, 241, 242, 282, 284, 285.

### Computer Engineering

Computer engineering combines electronic design, programming of computers, and mathematics. Students are prepared to design hardware and software for microcomputers and large-scale computing systems and to design computer hardware and software for control of large systems.

#### Core Curriculum

*First Semester*—CSci 51; Engl 9 or 10; EngS 1; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—CSci 110, 131; EngS 2; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 113; EE 11; Math 33; Phys 15; humanities or social sciences electives (6 hours).

*Fourth Semester*—ApSc 114; Chem 13; CSci 120; EE 20, 64; Phys 16.

#### Computer Engineering Curriculum

*Fifth Semester*—CSci 133, 140; EE 12, 30, 66, 67, 122.

*Sixth Semester*—ApSc 115; CSci 142, 144, 162, 165, 166, 172.

*Seventh Semester*—CSci 163, 182; EE 126, 143, 172; humanities or social sciences elective.

*Eighth Semester*—CSci 156, 164, 167, 188; EE 128; humanities or social sciences elective.

### Computer Science

The program combines systems design, computer programming, and mathematics to provide a broad background in the disciplines that underlie computer science. Students are prepared to design and implement the software needed for large computing systems and small microprocessor-based systems.

**Core Curriculum**

*First Semester*—CSci 51; Engl 9 or 10; EngS 1; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—CSci 110, 131; EngS 2; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 113; CSci 133; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—Chem 13; CSci 120, 142, 144; humanities or social sciences elective.

**Computer Science Curriculum**

*Fifth Semester*—ApSc 115; CSci 140, 145, 148, 152; Engl 110.

*Sixth Semester*—CSci 146, 155, 156, 172, 175; humanities or social sciences elective.

*Seventh Semester*—CSci 163, 168, 182; humanities or social sciences elective; nontechnical elective.

*Eighth Semester*—CSci 164, 174, 178, 185; nontechnical elective.

Note: Students admitted to the Honors Research Program may substitute ApSc 199 for one 3-credit elective course.

**Electrical Engineering**

Electrical engineering is concerned with the generation, transmission, control, and utilization of electricity. Electrical engineers design generators, electronic circuits, transmission networks, and voice, data, and video communications systems. They harness electromagnetic radiation and develop instrumentation to assist the medical profession in diagnosing and treating disease.

**Core Curriculum**

*First Semester*—CSci 50; Engl 9 or 10; EngS 1; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—Chem 13; CSci 57, 110; EngS 2; Math 32; Phys 14; humanities or social sciences elective (students in pre-med option take BiSc 12 instead).

*Third Semester*—ApSc 57, 113; EE 11; Math 33; Phys 15; humanities or social sciences elective (students in pre-med option take Chem 22 instead).

*Fourth Semester*—ApSc 58, 114; EE 20, 64; Phys 16; humanities or social sciences elective (students in pre-med option take Chem 23 instead).

**Electrical Engineering Curriculum**

*Fifth Semester*—CSci 140; EE 12, 31, 66, 67, 122; humanities or social sciences elective.

*Sixth Semester*—ApSc 115; EE 32, 121, 169, 177; technical elective selected from list below.

*Seventh Semester*—EE 143, 163, 172; technical elective; laboratory elective selected from list below; humanities or social sciences elective.

*Eighth Semester*—EE 144, 164; technical electives (6 hours); laboratory elective; nontechnical elective.

**Technical Electives**—CE 140; CSci 120, 162, 172, 182; EE 114, 117, 124, 126, 127, 128, 133, 134, 160, 178, 184, 192. Students may also elect appropriate graduate courses with the permission of their advisors.

**Laboratory Electives**—EE 146, 147, 166, 167, 168, 171, 176, 186, 196.



### **Premedical Engineering Option**

The premedical engineering option permits the student to obtain a bachelor's degree in engineering and have sufficient preparation to apply to a medical school for study toward the Doctor of Medicine degree. The student is also prepared to work in various health sciences fields and in the research and development of electronic equipment used in medicine or to continue as a graduate student in engineering with exceptional qualifications for medical engineering.

#### **Core Curriculum**

*First Semester*—BiSc 11; CSci 50; Engl 9 or 10; EngS 1; Math 31; Phys 13.

*Second Semester*—BiSc 12; Chem 13; CSci 57, 110; EngS 2; Math 32; Phys 14.

*Third Semester*—ApSc 57, 113; Chem 22; EE 11, Math 33; Phys 15.

*Fourth Semester*—ApSc 58, 114; Chem 23; EE 20, 64; Phys 16; humanities or social sciences elective.

#### **Premedical Engineering Curriculum**

*Fifth Semester*—Chem 151, 153; CSci 140; EE 12, 31, 66, 67, 122.

*Sixth Semester*—ApSc 115; Chem 152, 154; EE 32, 121, 169; humanities or social sciences elective.

*Seventh Semester*—EE 143, 163, 172; laboratory elective selected from EE 146, 147, 166, 167, 168, 171, 176; humanities or social sciences electives (6 hours).

*Eighth Semester*—EE 164, 184, 186, 192, 196; humanities or social sciences electives (6 hours).

### **Mechanical Engineering**

Mechanical engineering encompasses the greatest diversity of industrial activities. Mechanical engineers conceive, plan, design, and direct the manufacture, distribution, and operation of complex systems. Applications include aerospace, energy conversion, computer-aided design and manufacturing, power and propulsion systems, robotics, and control systems.

#### **Core Curriculum**

*First Semester*—CSci 50; Engl 9 or 10; EngS 1; Math 31; Phys 13; humanities or social sciences elective.

*Second Semester*—Chem 13; EngS 2, 4; Math 32; Phys 14; humanities or social sciences elective.

*Third Semester*—ApSc 57, 113, 115; Math 33; Phys 15; humanities or social sciences elective.

*Fourth Semester*—ApSc 58, 114; CE 140; EE 11; Phys 16; humanities or social sciences elective.

#### **Mechanical Engineering Curriculum**

*Fifth Semester*—CE 120, 166, 167; ME 117, 126, 131.

*Sixth Semester*—EE 20; ME 120, 134, 187, 191; humanities or social sciences elective.

*Seventh Semester*—ME 149, 182, 190, 192, 193; design elective selected from EngS 282 or ME 243, 259, or 291.

*Eighth Semester*—ME 152, 189, 195, 196; technical electives (6 hours) selected from chosen area; humanities or social sciences elective.

### Technical Electives

**Computer-Aided Design**—ME 197 (required); ApSc 199; CSci 120, 140, 144, 157; EngS 282, 283, 284, 285; ME 198, 241, 251.

**Energy and Power**—ME 155 (required); ApSc 199; EngS 208; ME 198, 257, 258, 259, 260, 291.

**Fluid Mechanics and Thermal Sciences**—ME 155 (required); ApSc 199; EngS 218; ME 198, 221, 231, 237, 280, 288, 289.

**Mechanical Engineering Design**—ME 197 (required); ApSc 199; EngS 215, 257, 284, 285; ME 198, 240, 241, 242, 243, 251.

**Solid Mechanics and Materials Engineering**—EngS 218 (required); ApSc 199; EngS 213, 214, 215, 221, 233, 234, 237, 285; ME 198; Phys 170.

### Systems Analysis and Engineering

In systems analysis and engineering, scientific methods and engineering techniques are applied to the solution of management problems, particularly those concerning the most efficient and effective use of resources. Practitioners seek to observe, understand, and predict the behavior of human-machine systems so that the best decisions about these systems can be made.

### Core Curriculum

**First Semester**—CSci 51; Engl 9 or 10; Math 31; Phys 13; humanities or social sciences elective.

**Second Semester**—Chem 13; CSci 110; Math 32; Phys 14; humanities or social sciences elective.

**Third Semester**—ApSc 57, 113; CSci 133; Math 33; Phys 15; humanities or social sciences elective.

**Fourth Semester**—ApSc 58, 114, 115; CSci 120; EMgt 160; humanities or social sciences elective.

### Systems Analysis and Engineering Curriculum

**Fifth Semester**—ApSc 116; CSci 131; OR 101, 109; Stat 187; humanities or social sciences elective.

**Sixth Semester**—CSci 144; Engl 110; OR 102; Stat 118; elective selected from chosen track (see below); humanities or social sciences elective.

**Seventh Semester**—CSci 155; OR 135, 190; Stat 181; elective selected from chosen track.

**Eighth Semester**—OR 151, 173, 191; two electives selected from chosen track.

### Elective Tracks

Each systems analysis and engineering major must take four courses in one of the following elective tracks.

**Computer Systems**—CSci 142, 148, 156, 174, 175, 178.

**Control and Instrumentation Systems**—EE 11, 12, 172, 184.

**Economic Systems**—Econ 101, 102, 121, and another course selected from 100-level offerings in economics, with approval of advisor.

**Electrical Energy Systems**—EE 11, 12, 31, 177.

**Electromechanical Systems**—ME 117, 126, 134, 182.

**Environmental Systems**—CE 193, 194, 197; ME 126.

**Financial Systems**—Accy 51, 52; Fina 120, 123.

**Management Decision Systems**—MLOM 140, 183, 188; SMPP 191; CSci 178.

**Mathematical Systems**—Math 101, 103, 113, 121, 122, 139, 140, 157.

**Mechanical Energy Systems**—CE 140; ME 126, 131, 194.

**Naval Systems**—NSc 150, 151, 175, 176.

**Network Systems**—EE 11, 12, 20, 114.



**Production Systems**—MLOM 188; SMPP 191; ME 190, 192.

**Statistical Systems**—OR 216; Stat 119, 123, 183, 188.

**Five-Year Bachelor of Science (Systems Analysis and Engineering)/  
Master of Science in the Field of Operations Research**

Course work for the bachelor's degree comprises the same courses as the standard B.S. (S.A.&E.). Application to the graduate portion of the program is ordinarily made after the fifth semester. The bachelor's degree is awarded after the eighth semester.

The fifth year of study, leading to the master's degree, offers two options.

For the regular M.S. in operations research, students take OR 216 and seven other graduate courses chosen in consultation with the advisor. At least five of the seven courses must be in the Department of Operations Research.

For the M.S. in operations research with a concentration in management science, students take OR 236, EMgt 281 or 283, EMgt 287 or Mgt 224 or 226, and five other graduate courses selected with the approval of the advisor from course offerings in the Department of Operations Research and other departments of the university.

After completing the fifth year of course work and passing the Master's Comprehensive Examination, students receive the M.S. degree. See the Graduate Programs Bulletin.

**Five-Year Bachelor of Science (Systems Analysis and Engineering)/  
Master of Arts in the Field of Economics**

For the first four semesters, the core curriculum differs only in that Econ 11, 12, 101, and 102 replace the humanities or social science electives. The systems analysis and engineering curriculum for the fifth through eighth semesters follows.

**Fifth Semester**—ApSc 116; CSci 131, 155; OR 101; Stat 187; humanities elective.

**Sixth Semester**—CSci 144; Econ 123; Engl 110; OR 102, 109; humanities elective.

**Seventh Semester**—OR 135, 190; Stat 181; Econ 203, Microeconomic Theory; humanities elective.

**Eighth Semester**—OR 151, 173, 191; Econ 204, Microeconomic Theory, Econ 205, Macroeconomic Theory I.

Application to the graduate portion of the program is ordinarily made after the fifth semester. The bachelor's degree is awarded after the eighth semester.

The ninth and tenth semesters consist of course work toward the master's degree. Required: the general requirements of Columbian College and Graduate School of Arts and Sciences, including Econ 206, Macroeconomic Theory II, Econ 275, Econometrics I, and six graduate economics electives. The Master's Comprehensive Examination must be satisfactorily completed in microeconomic and macroeconomic theory. See the Graduate Programs Bulletin.

**Honors Research Program**

To provide individualized research experience to academically gifted students, the School has established an Honors Research Program. A student who maintains a grade-point average of 3.3 or above or is admitted to the School with a combined SAT score of 1250 and a rank in the upper 10 percent of his or her high school class is eligible for this program. Participants attend an honors research seminar and each works individually with a faculty member, performing a research project of mutual interest. Students participating in the program earn 3 credits per semester; a minimum of 9 credits is needed to complete the program.

Upon written request by the student, 6 of these credits may be used as technical electives. Qualified students interested in applying for the program should contact the honors research chairman of the department in which the research is to be conducted.

### **Secondary Fields of Study**

The School of Engineering and Applied Science offers secondary fields of study in computer science, electrical engineering, engineering analysis, and operations research to students in other schools of the University.

SEAS students are cautioned to consult their advisor and department chair before enrolling in a secondary field of study in another school of the University.

### **3:2 Dual-Degree Programs Combining Liberal Arts and Engineering**

The School of Engineering and Applied Science has developed 3:2 dual-degree programs in liberal arts and engineering with the following accredited institutions: Bowie State College, Gallaudet University, Georgian Court College, Hood College, St. Joseph College, Southeastern College (Athens, Greece), and Wheaton College.

Students initially enroll in the 3:2 dual-degree program at one of the above institutions and pursue a three-year course of studies covering social sciences, humanities, mathematics, physics, and chemistry, which helps the student develop broad cultural perspectives, analytic abilities, and communication skills. Students then follow a two-year career program in engineering at the School of Engineering and Applied Science. During this phase of study, students may specialize in any of the areas of engineering offered in the School's regular four-year programs. Upon successful completion of the two-year engineering program at George Washington University, students are awarded two baccalaureate degrees: a B.S. or B.A. from the first institution and a B.S. in engineering or computer science from GW.

For further information on the 3:2 dual-degree programs, contact the admissions offices of the institutions listed above.



## ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS

Dean M.A. East

Associate Deans J.R. Millar, N.J. Brown

### Introduction

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for an increasingly international and multinational environment. The historical roots of the Elliott School can be traced back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott, the President of The George Washington University from 1965 to 1988.

### The Degree of Bachelor of Arts

The Elliott School offers programs leading to the degree of Bachelor of Arts in the fields of international affairs, East Asian studies (China or Japan), Latin American studies, and Middle Eastern studies. Programs are multidisciplinary and emphasize both domestic and foreign governmental policy. Curricula draw heavily on the various academic departments of the University. Programs are designed to foster a liberal education that focuses on a solid understanding of major historical and contemporary issues in international affairs; the programs tend to have a broader base than a major in a traditional academic discipline.

### Entrance Requirements

Good character and an academic background appropriate for the program of studies contemplated are required.

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least 15 units. A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods, or the equivalent, of prepared classroom work. The program must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and one year of college-preparatory mathematics beyond introductory algebra.

2. The principal's statement that the applicant is prepared to undertake college work.

3. Standardized test scores submitted on College Board Achievement Tests in English composition and mathematics and on the Scholastic Aptitude Test, or on the American College Testing battery.

It is recommended that the College Board examinations be taken in December or January. Scores on tests taken in the junior year may be submitted. Arrangements for tests are the responsibility of the applicant and should be made with the College Board Admissions Testing Program, CN 6200, Princeton, N.J. 08541-6200, not less than one month before the date of the tests. In applying for the test, the applicant should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20052.

American College Testing battery scores are also accepted. The applicant should request that these scores be sent to the Office of Admissions directly from

the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

Consideration can be given to the adequacy of the qualifications of an applicant who, because of unusual circumstances, does not present all the requirements stated here. Appropriate scholastic aptitude tests may be prescribed.

### **Admission with Advanced Standing**

Requirements for admission of students transferring from other regionally accredited colleges and universities and from other divisions of this University are as follows. Applicants who have accumulated at least 30 credit hours (or the equivalent) of academic credit at another regionally accredited college or university may be admitted to the Elliott School of International Affairs as transfer students with advanced standing. Those who have achieved a grade-point average of at least 3.0 on a 4.0 scale in previous college work will be given preference for admission. Applicants who have completed fewer than 30 credit hours of acceptable credit must meet entrance requirements for freshmen.

Advanced standing may be awarded for properly certified courses for which the student received a grade of C- or above, provided that such courses are comparable to the curriculum requirements for the degree sought in the Elliott School. In the case of course work completed at a two-year college, no more than 66 credit hours of credit may be applied as advanced standing toward a degree in this School.

Although a grade of D in a course is not acceptable for transfer, the course may satisfy a curriculum requirement. Credits earned with a grade of D will not, however, be assigned as advanced standing.

The Elliott School reserves the right to refuse credit for transfer in whole or in part or to accept credit provisionally.

It is the responsibility of the student to have an official transcript from each institution formerly attended sent directly to the Office of Admissions, George Washington University, Washington, D.C. 20052.

Students wishing to transfer from another division of the University into a degree program in the Elliott School must submit to the Office of Admissions a formal application for transfer and must be in good academic standing with a cumulative grade-point average of 2.5 or above at the time of transfer. A maximum of 45 credit hours earned as a nondegree student in the Division of Continuing Education may be applied toward a degree in this School.

All transfer students must satisfy the residence and course requirements for degrees awarded by the Elliott School.

### **Regulations**

See Admissions; Fees and Financial Regulations; University Regulations.

### **General Requirements for the Degree**

#### **Academic Work Load**

The normal academic work load for a full-time student is 15 credit hours. A full-time student not on probation may take a course load of up to 17 credit hours. A student with a strong academic record may take up to 18 credit hours with the approval of the dean. Students on probation are limited to 13 hours.

#### **Attendance**

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.



### Scholarship Requirements

In order to graduate, a student must have the following: (1) 120 credit hours of passing grades (courses in exercise and sport activities cannot be included in the required hours); and (2) a cumulative grade-point average of at least 2.0.

### Dean's Honor List

The name of every student who attains a 3.5 grade-point average in course work is placed on the Dean's Honor List for that semester. Appearance on the list is limited to full-time students registered for a minimum of 12 credit hours in a given semester and to part-time students registered for a minimum of 12 credit hours over a period of two consecutive semesters, which may include a summer term.

### Academic Standing

A student whose cumulative grade-point average is less than 2.0 but at least 1.0 any time after having enrolled in a minimum of 24 credit hours is placed on probation: "first probation" for the initial semester, "second probation" if continued on probation for a second semester. For part-time students and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 12 credit hours have accrued. A student on probation is limited to no more than 13 credit hours of course work per semester.

A student who resumes a cumulative grade-point average of 2.0 or more after a first or second semester on probation is removed from probationary status. Failure to resume a cumulative grade-point average of 2.0 after two successive semesters on probation results in suspension. The Dean's Council may continue a student on probation if satisfactory progress is demonstrated during the probation period.

A student whose cumulative grade-point average falls below 1.0 any time after having enrolled in a minimum of 24 credit hours as a student in the Elliott School will be suspended.

Students who are suspended for poor scholarship may apply for readmission after the lapse of one fall or spring semester. To be considered for readmission, the student must submit evidence to the Dean's Council of conduct during absence from the University which indicates that the student will profit from readmission. A student suspended twice for poor scholarship will not be readmitted.

### Withdrawal

Withdrawal without academic penalty after the end of the fifth week of classes (fall or spring semester) is permitted only in exceptional cases (see Withdrawal under University Regulations).

### Incomplete/Authorized Withdrawal

Conditions under which the grades *I* (Incomplete) or *W* (Authorized Withdrawal) may be assigned are described under University Regulations.

**Changing an Incomplete**—The grade of *I* must be changed no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An Incomplete that is not changed within this period automatically becomes an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the dean, or the appropriate committee, for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be changed by re-registering for the course here or by taking its equivalent elsewhere.

**Residence**

A minimum of 30 credit hours, including at least 12 hours in the major field, must be completed while registered in the Elliott School of International Affairs. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Unless special permission is granted by the dean to pursue work elsewhere, the last 30 credit hours must be completed in the Elliott School.

**Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the dean.

**Internships**

Internships offer students the opportunity to make practical use of the knowledge they acquire in the classroom. Undergraduates who have completed at least 30 credit hours are eligible to arrange internships for credit. Academic work in the field of the internship is required.

Internships are available in the private and public sectors. Students are responsible for locating their own internships; listings are posted in the GW Career and Cooperative Education Center. (Additional listings are posted in the Elliott School.)

**Regulations on Study Abroad**

Students are encouraged to travel and study abroad. Those wishing to study abroad must consult their academic advisor and the study-abroad advisor. Students must secure the dean's prior approval for any plan of study abroad if the credit earned is intended to apply to the degree program in which they are registered. A catalogue or other description of the foreign institution or study program must be presented for consideration together with detailed descriptions of the courses to be taken. See Study Abroad Programs.

**Pass/No Pass Option**

A student in the Elliott School of International Affairs who has a cumulative grade-point average of 2.5 or better may, with the approval of an advisor and the dean, take one course per semester and receive a grade of P, Pass, or NP, No Pass, which will be recorded on the student's transcript but will not be reflected in the cumulative grade average. A student must sign up for such an option at registration. Under no circumstances may a student change from pass/no pass status to graded status, or vice versa, after the end of registration. Courses in the student's major (except those in which the grade of P or NP is normally assigned) may not be taken on a pass/no pass basis. A transfer student may not elect to take a course on a pass/no pass basis until the second semester of enrollment in the University. No more than six courses in which the grade of P or NP is assigned will apply toward the degree, including courses in which the grade of P or NP is normally given.

**Earning Credit or Waiving Requirements by Examination**

For information on earning credit by examination or waiving curriculum requirements, see your academic advisor in the Elliott School.



### Curriculum Requirements

Curriculum requirements for the first two years are outlined below. Requirements for majors in international affairs, Latin American studies, Middle Eastern studies, and East Asian studies (China or Japan) are outlined under the appropriate heading in Courses of Instruction.

	Credit Hours
English: Engl 9 or 10, and 11.....	6
Humanities: AmCv 71-72; Art 31-32 or 71-72; Clas 107, 108, 113; Hmn 1-2, 4, 6; *literature (American, Chinese, East Asian, English, French, German, Greek and Latin, Italian, Slavic, or Spanish); Mus 3, 4; first- or second-group phi- losophy courses; Rel 1, 2.....	9
†Language: Chinese, Japanese, Korean, French, German, Hebrew, Italian, Russian, or Spanish.....	12
Math/Science: BiSc 3-4 or 11-12; Chem 3-4 or 11-12; Geol 1-2; Math 9 and 10, 12 and 13, 30 and 31, or 51 and 52; Phys 1, 2, 5, and 6, or 9-10; Stat 51, 53, or 91, and 105 or 129; 129, 130; 111, 112.....	6
Social Science: Econ 11-12; Hist 40 and 72; PSc 1, 2.....	18
*Elective: .....	9
Total.....	60

### Secondary Fields of Study

Students can take a secondary field of study, such as business, economics, or languages, in other schools of the University. Students from other schools of the University can take a secondary field of study in international affairs in the Elliott School of International Affairs. See the brochure "Secondary Fields of Study," available in the Student Services Office.

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\* If a student elects 9 credit hours of literature in any foreign language, this cannot be used to satisfy the language requirement.

† Chin 5-6 is required for East Asian studies (China focus) majors; Japn 3-4 is required for East Asian studies (Japan focus) majors. Greek and Latin are not acceptable for international affairs majors. Latin American studies majors must include Spanish. All Elliott School students are required to complete a third-year level of language study.

‡ Credit is not given for exercise and sport activities courses.

## SCHOOL OF MEDICINE AND HEALTH SCIENCES

The School of Medicine and Health Sciences offers a broad range of undergraduate programs to prepare health sciences professionals for roles in selected disciplines that complement the medical profession. These programs emphasize the interdependent roles and responsibilities of the network of professionals who bring a variety of skills and expertise to the health care team. For specific information on the content and requirements of the programs that follow, see the School of Medicine and Health Sciences Bulletin or contact the Office of Health Sciences Programs Administration, School of Medicine and Health Sciences, George Washington University, Washington, D.C. 20037.

### Majors Leading to the Associate in Science

**Nuclear Medicine Technology**—Nuclear medicine technologists are trained in a variety of procedures that trace radioactive substances in the body. The radio-pharmaceuticals reveal the structure and function of various organs, which could not otherwise be detected, thereby assisting physicians in the diagnosis and treatment of disease.

**Prehospital Clinical Medicine**—Prehospital providers are ambulance or rescue squad personnel who are involved in initial evaluation and management of seriously injured or ill patients, interpretation of patient signs and symptoms, and communication of observations to emergency department personnel.

**Radiation Therapy Technology**—Radiation therapy technologists are members of a team of specialists who provide radiation treatment to cancer patients. Radiation therapy technologists are involved in patient care, treatment planning, and the delivery of prescribed radiation treatment.

### Majors Leading to the Bachelor of Science

**Emergency Medical Services**—Emergency medical services personnel may plan and organize programs, supervise prehospital providers, assist in projects that require expertise in emergency medical procedures, and function in the network of information systems that is central to emergency care.

**Medical Technology**—Medical technologists perform and evaluate various laboratory procedures to determine the absence, presence, extent, and basis of disease. As medical investigators, medical technologists perform complex examinations on state-of-the-art instruments and computers in the areas of hematology, chemistry, microbiology, immunology, and blood banking.

**Physician Assistant**—Physician assistants provide a variety of patient care services under the supervision of a physician. Responsibilities include direct patient care involving diagnostic, therapeutic, and preventive medicine. Physician assistants are actively involved in decision making and implementation of therapeutic plans to allow more effective use of a physician's time.

**Radiological Sciences and Administration**—Radiological sciences administrators are prepared to assume the management of technologists in radiology departments. Responsibilities may include implementing quality control procedures and performing specialized radiographic techniques and procedures.

### Joint Programs Leading to the Doctor of Medicine

In addition to the integrated Bachelor of Arts/Doctor of Medicine program and the combined degrees of Bachelor of Arts and Doctor of Medicine described under Columbian College and Graduate School of Arts and Sciences, the School



of Medicine and Health Sciences offers an early selection program intended to give talented and committed students early assurance of admission to the M.D. program. Students of exceptional promise are chosen for the early selection program at the end of their sophomore year and are expected to modify their planned curriculum for the junior and senior years toward more creative and difficult course choices. Early assurance of admission is planned to provide students the freedom to pursue a rigorous liberal education, while completing minimal premedical requirements without concern for the grade-point average. Specific details about the early selection program are available through the Office of Admissions of the School of Medicine and Health Sciences.

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## COURSES OF INSTRUCTION

The following section provides listings and descriptions of courses offered by the departments of instruction and interdepartmental programs. Degree requirements of departments and programs in Columbian College and Graduate School of Arts and Sciences and the Elliott School of International Affairs appear under the department or program heading; degree requirements of the Schools of Engineering and Applied Science, Education and Human Development, and Business and Public Management appear under the respective school's section.

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the title of the course. Thus, a year course giving 3 credit hours each semester is marked (3-3), and a semester course giving 3 credit hours is marked (3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled. The term *academic year* is used only with two-semester courses and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Not all offerings for the summer sessions are listed in this Bulletin. Students should consult the Summer Sessions Announcement for additional summer offerings. Schedules of Classes are published for the fall/summer and spring semesters to provide information concerning the time of course offerings.

The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to change the course fees shown herein.

### Explanation of Course Numbers

**First-Group Courses**—Courses numbered 1-100 are planned for students in the freshman and sophomore years. With the approval of the advisor and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

**Second-Group Courses**—Courses numbered 101-200 are planned for students in the junior and senior years. Except for accountancy courses, they may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work to receive graduate credit. Accountancy courses numbered 101-200 may not be taken for graduate credit.

**Third-Group Courses**—Courses numbered 201-300 are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Business and Public Management registering for these courses must have a 3.0 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the dean. Non-degree students who have not completed a bachelor's degree may not enroll in graduate courses offered by the School of Business and Public Management.

**Fourth-Group Courses**—Courses numbered 301-400 in Columbian College and Graduate School of Arts and Sciences and the School of Engineering and Applied Science are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301-400 in the School of Business and Public Management are primarily for doctoral students; the courses are open to selected master's students upon approved petition. In the School of Education and Human Development courses numbered 301-400 are limited to graduate students with master's degrees from accredited institutions.



**Fifth-Group Courses**—Courses numbered 701 and 721 represent an ongoing program of curriculum innovation at GW. The 701 number is used to designate experimental courses taught by individual faculty members. The 721 number designates innovative interdepartmental courses. The 751 number is used to list courses sponsored jointly by two or more schools. Courses numbered in the 770s are taught by scholars who hold appointments as University Professors. The 700 numbers do not indicate the level of difficulty. Courses in this series range from freshman-level offerings to classes designed for seniors and graduate students. Unless the course description in the *Schedule of Classes* indicates that there are prerequisites or that an interview with the instructor is required prior to registration, 700 courses are open to all interested students, subject to their advisor's approval and the rules of the respective colleges.

### Key to Abbreviations

The following abbreviations are used for course designations:

<b>Accy</b>	Accountancy	<b>Geog</b>	Geography and Regional Science
<b>AdSc</b>	Administrative Sciences	<b>Geol</b>	Geology
<b>AmCv</b>	American Civilization	<b>Ger</b>	Germanic Languages and Literatures
<b>Anat</b>	Anatomy	<b>HCS</b>	Health Care Sciences
<b>Anes</b>	Anesthesiology	<b>HSMP</b>	Health Services Management and Policy
<b>Anth</b>	Anthropology	<b>Hist</b>	History
<b>ApSc</b>	Applied Science	<b>Honr</b>	Honors
<b>Art</b>	Art	<b>HRD</b>	Human Resource Development
<b>ArTh</b>	Art Therapy	<b>HmSc</b>	Human Sciences
<b>AM</b>	Association Management	<b>HmSr</b>	Human Services
<b>Bioc</b>	Biochemistry	<b>Hmn</b>	Humanities
<b>BiSc</b>	Biological Sciences	<b>Idis</b>	Interdisciplinary Courses
<b>Chem</b>	Chemistry	<b>IAff</b>	International Affairs
<b>Chin</b>	Chinese	<b>IBus</b>	International Business
<b>CE</b>	Civil Engineering	<b>Ital</b>	Italian
<b>Clas</b>	Classics	<b>Japn</b>	Japanese
<b>CCAS</b>	Columbia College of Arts and Sciences	<b>Jour</b>	Journalism
<b>Comm</b>	Communication	<b>Kor</b>	Korean
<b>CpMd</b>	Computer Medicine	<b>Law</b>	Law
<b>CScl</b>	Computer Science	<b>Ling</b>	Linguistics
<b>Cnsl</b>	Counseling	<b>Mgt</b>	Management Science
<b>Derm</b>	Dermatology	<b>MLOM</b>	Marketing, Logistics, and Operations Management
<b>Econ</b>	Economics	<b>Math</b>	Mathematics
<b>Educ</b>	Educational Leadership	<b>ME</b>	Mechanical Engineering
<b>EE</b>	Electrical Engineering	<b>Med</b>	Medicine
<b>EMed</b>	Emergency Medicine	<b>Micr</b>	Microbiology
<b>EMgt</b>	Engineering Administration	<b>MStd</b>	Museum Studies
<b>EngS</b>	Engineering Science	<b>Mus</b>	Music
<b>Engl</b>	English	<b>NSc</b>	Naval Science
<b>EFL</b>	English as a Foreign Language	<b>NSur</b>	Neurological Surgery
<b>E&amp;RP</b>	Environmental and Resource Policy	<b>Neur</b>	Neurology
<b>EnHe</b>	Environmental Health	<b>NeuS</b>	Neuroscience
<b>Envr</b>	Environmental Studies	<b>Ob&amp;G</b>	Obstetrics and Gynecology
<b>EMBA</b>	Executive Master of Business Administration	<b>OR</b>	Operations Research
<b>ExSA</b>	Exercise and Sport Activities	<b>Ophth</b>	Ophthalmology
<b>ExSc</b>	Exercise Science	<b>Orth</b>	Orthopaedic Surgery
<b>Fina</b>	Finance	<b>Path</b>	Pathology
<b>ForS</b>	Forensic Sciences	<b>PSld</b>	Peace Studies
<b>Fren</b>	French	<b>Peds</b>	Pediatrics
<b>Gnet</b>	Genetics	<b>Phar</b>	Pharmacology
<b>Geob</b>	Geobiology		

<b>Phil</b>	Philosophy	<b>Slav</b>	Slavic Languages and Literatures
<b>Phys</b>	Physics	<b>Soc</b>	Sociology
<b>Phyl</b>	Physiology	<b>Span</b>	Spanish
<b>PCm</b>	Political Communication	<b>SpEd</b>	Special Education
<b>PPay</b>	Political Psychology	<b>SpHr</b>	Speech and Hearing
<b>PSc</b>	Political Science	<b>Stat</b>	Statistics/Computer and Information Systems
<b>Port</b>	Portuguese	<b>SMPP</b>	Strategic Management and Public Policy
<b>Pchi</b>	Psychiatry and Behavioral Sciences	<b>Surg</b>	Surgery
<b>Psyc</b>	Psychology	<b>TrEd</b>	Teacher Education
<b>PAd</b>	Public Administration	<b>TCom</b>	Telecommunication
<b>PubH</b>	Public Health	<b>TrDa</b>	Theatre and Dance
<b>PPol</b>	Public Policy	<b>TrSt</b>	Tourism Studies
<b>Rad</b>	Radiology	<b>Univ</b>	University
<b>Rel</b>	Religion	<b>Urol</b>	Urology
<b>Rom</b>	Romance Literatures	<b>WStu</b>	Women's Studies
<b>SLP</b>	Service-Learning Program		

## ACCOUNTANCY

Professors A.J. Mastro, C.M. Paik, M.G. Gallagher, J. Hilmy, F.W. Segel, D.R. Sheldon (Chair), W.R. Baber, F.D. Fowler, R.G. Stevens (Visiting)  
Associate Professors L.G. Singleton, K.E. Smith, L.C. Moersen  
Assistant Professors S.M. Moody, T. Verghese, K.R. Kumar

See the School of Business and Public Management for programs of study in accountancy leading to the degree of Bachelor of Accountancy.

- 51 Introductory Financial Accounting (3)** Kumar and Staff  
Basic knowledge of financial accounting concepts and standards as an essential part of the decision-making process for the management of private investment and for business and government organizations. Students who have received credit for a similar financial accounting course cannot receive credit for Accy 51.  
Prerequisite: sophomore standing. (Fall and spring)
- 52 Introductory Managerial Accounting (3)** Kumar and Staff  
Basic knowledge of managerial accounting concepts, procedures, analyses, and internal reports as an essential part of the decision-making process for public- and private-sector organizations. Prerequisite: Accy 51. Students who have received credit for a similar managerial accounting course cannot receive credit for Accy 52. (Fall and spring)
- 101 Cost and Budgetary Control (3)** Singleton  
Nature, objectives, basic systems, and procedures of cost accounting and control: cost-volume-profit relationships, standard costs and variance analysis, variable costing, relevant costs, process costing, costing for services, activity-based costing, budgeting, cost allocations. Prerequisite: Accy 51-52. (Fall and spring)
- 111 Financial Statement Analysis (3)** Hilmy  
Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Accy 51-52. (Fall and spring)
- 121 Intermediate Accounting (3)** Mastro  
In-depth study of accounting functions and basic theory; acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Accy 51-52. (Fall)
- 132 Accounting Theory (3)** Hilmy, Segel  
Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Accy 121. (Spring)
- 151 Business Law for Accountants I (3)** Moersen  
An introduction to the legal process and business law concepts for the professional accountant. Contracts, sales, commercial paper, and the legal liabil-



- ity and ethical standards of professional accountants. Prerequisite: Accy 51-52. (Fall)
- 152 **Business Law for Accountants II** (3) Moersen  
A broadening of business law concepts—partnerships, corporations, agency, wills, property, the debtor-creditor relationship, and securities. Prerequisite: Accy 151. (Spring)
- 161 **Federal Income Taxation: Individuals** (3) Gallagher  
A study of federal income tax concepts with primary emphasis on individuals. Prerequisite: Accy 51-52. (Fall)
- 162 **Federal Income Taxation: Corporations, Partnerships, Estates, and Trusts** (3) Gallagher  
Federal income tax concepts applicable to corporations, partnerships, estates, and trusts; tax research and planning. Prerequisite: Accy 161. (Spring)
- 171 **Auditing** (3) Stevens  
Principles and procedures of auditing; generally accepted auditing standards, internal control, audit objectives and reports, audit evidence, professional and legal responsibility, and audit of EDP systems. Prerequisite: Accy 121. (Fall)
- 181 **Accounting Systems** (3) Segel, Verghese  
Introduction to the design and operation of accounting systems and data-management controls. Principles and applications of internal control applicable to manual and automated accounting systems. Prerequisite: Accy 101, 121. (Fall)
- 190 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods. Prerequisite: department approval.
- 191 **Advanced Accounting** (3) Mastro  
Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, governmental and not-for-profit accounting. Prerequisite: Accy 121. (Spring)
- 199 **Independent Study** (3) Staff  
Assigned topics. Admission by permission of the department chair. (Fall and spring)

## AFRICAN AND AFRICAN-AMERICAN STUDIES

Courses that pertain to African and African-American studies are offered by the Departments of Anthropology, English, Geography and Regional Science, History, Philosophy, Political Science, and Sociology and by the American Studies and Humanities Programs. In addition to courses that are offered regularly, pertinent Special Topics courses are often available. Many additional courses on African and African-American studies are offered through the Consortium of Universities of the Washington Metropolitan Area. The Office of the University Registrar maintains copies of schedules of classes for member institutions.

- AmCv/Hist 173 **African-American History**  
Anth 170 **Cultures of the Caribbean**  
Anth 178 **Cultures of Africa**  
Engl 169 **Ethnicity and Place in American Literature**  
Engl 174 **African-American Literature**  
Geog 184 **Geography of Africa**  
Hist 116 **History of Africa**  
Hist 174 **Special Topics in African-American History**  
Hist 184 **Civil War and Reconstruction**  
Hmn 7 **African Humanities**  
IAff 93 **Africa: Problems and Prospects**  
Phil 125 **Philosophy of Race and Gender**  
PSc 180 **Governments and Politics of North Africa**  
PSc 181 **Politics of Middle and Southern Africa**  
PSc 182 **African International Politics**  
PSc 186 **U.S. Policies Toward Sub-Saharan Africa**  
Soc 129 **Race and Minority Relations**

## AMERICAN STUDIES

Professors R.H. Walker, Jr., C.C. Mondale (Emeritus), B.M. Mergen, H.F. Gillette, Jr., J.M. Vlach (Director), J.O. Horton  
 Associate Professors R.W. Longstreth, P.M. Palmer, T.A. Murphy  
 Adjunct Associate Professor P.J. Cressey

Minor in American civilization—Required: 18 credit hours of 100-level courses, including AmCv/Hist 167, 171–72, and three courses chosen with approval of the advisor in topics related to American civilization, such as literature, art and architecture, history, African-American culture, and folklife.

- 50 **Washington, D.C.: History, Culture, and Politics** (3) Gillette  
 Introduction to interdisciplinary methods of studying the contemporary city. Major problems of metropolitan life, past and present, analyzed by faculty and community leaders. Emphasis on experiential team projects. Same as Hist/PSc 50. (Fall)
- 71–72 **Introduction to American Civilization** (3–3) Mergen, Murphy, Palmer, Gillette  
 Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. (Academic year)
- 115 **Meso-American Field Program** (3 or 6) Humphrey, Mergen, Price  
 Field study in Mexico and Central America. Same as Anth/Geog 115. (Summer)
- 144 **Explorations in Historical Geography** (3) Mondale  
 Examination of selected themes in the cultural geography of the United States over the course of its history, in relation to an overview of the historical geography of the country. Same as Geog 144. (Spring)
- 145 **Folk Arts in America** (3) Vlach  
 Same as Art 145.
- 165 **Introduction to Folklore** (3) Vlach  
 Survey of the forms of folk expression, including verbal art, music, dance, and material culture. Examination of the materials and methods of folklore research. Same as Anth 165.
- 167 **Themes in U.S. Cultural History** (3) Gillette, Mergen  
 An examination of the special ideas, values, and modes of expression that have made American life distinctive, as revealed through a variety of sources, including fiction, popular media, photography and the arts, and material culture. Same as Hist 167. (Fall)
- 171–72 **U.S. Social History** (3–3) Horton  
 Same as Hist 171–72.
- 173 **African-American History** (3) Horton  
 Same as Hist 173.
- 175–76 **American Architecture** (3–3) Longstreth  
 Stylistic properties, form and type characteristics, technological developments, and urbanistic patterns are introduced as a means of interpretation of historic meaning. Buildings are analyzed both as artifacts and as signifiers of social, cultural, and economic tendencies. AmCv 175: 1600–1860; AmCv 176: 1860–present. Same as Art 176 and 191. (Academic year)
- 179–80 **Proseminar in American Civilization** (3–3) Walker  
 Coordinating course for seniors who were declared majors in American civilization by fall 1991. (Academic year)
- 186 **U.S. Urban History** (3) Stott, Gillette  
 History of the American city from colonial foundations to the present, focusing on relationships between social and economic forces with physical form. Special emphasis on transitions from pre-industrial to industrial to metropolitan forms, with attention to implications for public policy and historic preservation. Same as Hist 186. (Fall)
- 192 **The American Cinema** (3) Mergen  
 History and criticism of American films. The course will enable the student to recognize and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture. Same as Art 192. (Spring)
- 193 **Archaeology Field/Laboratory Research** (3) Brooks, Cressey  
 Same as Anth 193.



- 194 Historical Archaeology (3)** Cressey  
Same as Anth 194.
- 195 Independent Study (3)** Staff  
Open to a limited number of American Civilization majors as directed research or as an internship with a Washington museum or historical society. Approval of advisor required. (Fall and spring)
- 197 Oral History and Interview Techniques (3)** Mergen, Gillette  
Introduction to theory and practice of obtaining and using historical data through recorded interviews. Examination of major published works in oral history. Particular attention to ongoing oral history projects in the Washington area. Same as Anth/Hist 197. (Summer)
- 198 Special Topics (3)** Staff  
May be repeated for credit provided the topic differs. Admission by permission of instructor.
- 199-200 Senior Thesis (3-3)** Staff  
Directed research project. Open to seniors who were declared majors by fall 1991. Prerequisite: permission of program director. (Academic year)

### ANTHROPOLOGY

Professors R.M. Krulfeld, R.L. Humphrey, Jr., A.S. Brooks (Chair), C.J. Allen  
 Professorial Lecturers D.H. Ubelaker, S. Hertz  
 Associate Professor J.C. Kuipers  
 Adjunct Associate Professors C.R. Rose, P.J. Cressey  
 Associate Professorial Lecturer N.L. Benco  
 Assistant Professor R.R. Grinker  
 Adjunct Assistant Professor E.M. Suthers  
 Lecturers A.G. Webster, C. Griggs

*Bachelor of Arts with a major in anthropology*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Anth 1, 2, 3, and 4.
3. Required courses in other areas—(a) 12 credit hours, or equivalent, of introductory French, German, Russian, or Spanish (or another major language approved by the Anthropology Department); (b) 6-12 credit hours of course work in related departments. Recommended for ethnological emphasis are courses in economics, political science, psychology, and sociology; for archaeological emphasis, courses in American civilization, art history, geography and regional science, geology, and history; for emphasis in biological anthropology, courses in anatomy and biological sciences; for emphasis in linguistic anthropology, courses in linguistics and in speech and hearing. Courses in philosophy and statistics are strongly recommended for all anthropology majors.
4. Requirements for the major—24-36 credit hours in 100-level anthropology courses, including Anth 198 and at least one course from each of the following five categories: aspects of culture (courses numbered in the 150s and 199 and 200), linguistics (161, 162, 168, and 169), ethnology (courses numbered in the 170s), biological anthropology (courses numbered in the 140s), and archaeology (courses numbered in the 180s). Qualified seniors may enroll in 200-level seminar courses with the permission of the instructor. See the Graduate Programs Bulletin. Up to 6 credit hours of ethnographic or archaeological field school credit may be accepted and applied toward the major, if approved by the department, and majors are encouraged to participate in such summer programs. Opportunities are available for field and laboratory research during the academic year, both within the department and elsewhere in the Washington area. Credit for such work (not to exceed one-quarter of the student's total second-group credit hours in anthropology) may be granted through registration in Anth 195. Candidates for graduation with Special Honors must register for 3 credit hours of Anth 195. Undergraduate Research, and write a paper of special distinction arising out of a program of directed reading or research.

*Bachelor of Arts with a major in classical archaeology and anthropology*—An inter-departmental major offered by the Anthropology and Art Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Required courses in other areas: 6 credit hours, or equivalent, of introductory French, German, Latin, Greek, or a Near Eastern language. A second year of language study is strongly encouraged. Since graduate study in classical archaeology usually involves broader preparation and requires knowledge of at least one classical and one modern language, students intending to pursue graduate study should consult with the departmental advisor as early as possible in their undergraduate programs.

3. Required courses in the major: Anth 3, 183, 184, and one course chosen from Anth 152, 158, 177, or an approved 3-hour course in field work; four courses chosen from Art 101, 102, 103, 112, 155; two courses chosen from Clas 71, 72, 107, 113, 170; two courses chosen from Hist 107, 108, 109, 110 (students electing Hist 108 should previously have completed Hist 107 or 109).

*Minor in general anthropology*—21 credit hours are required, including Anth 1, 2, 3, 4, 198, and two additional courses in anthropology, which must be taken in different subdisciplines. For the purposes of this minor, the department's courses may be divided into subdisciplines as follows: biological anthropology—Anth 146, 147, 148; archaeology—Anth 182, 183, 184, 185, 186, 190, and 194; anthropological linguistics—Anth 161, 162, 168, and 169; sociocultural anthropology—all other 100-level courses, with the exception of Anth 195 and 196, in which the topic is variable.

*Minor in archaeology*—18 credit hours are required, including Anth 3, four courses chosen from Anth 182, 183, 184, 185, 190, and 194; an approved field or research course or a fifth course chosen from the preceding list.

*Minor in biological anthropology*—15–18 credit hours are required, including Anth 1, 146, 147, and 148; an approved field or research course or an approved course or course sequence in a related field (including biological sciences, geology, psychology, statistics, and certain other disciplines).

*Minor in sociocultural anthropology*—18 credit hours are required, including Anth 2 and 198; one course in ethnography (Anth 170–179); Anth 151 or 152; Anth 156 or 157; one course chosen from Anth 150, 153, 155, 158, 159, or 200.

*Minor in cross-cultural communication*—18 credit hours are required, including Anth 2 or 4, 161, 162; Anth 150 or 159; one course in ethnography (Anth 170–179); one course chosen from Anth 153, 155, 158, 163, 165, or 168.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- |     |  |                                   |
|-----|--|-----------------------------------|
| 1   | <b>Biological Anthropology</b> (3)   | Brooks and Staff                  |
|     | Survey of human evolution, genetics and physical variation, and primatology. Frequent laboratory exercises. Laboratory fee, \$15. (Fall and spring)  |                                   |
| 2   | <b>Sociocultural Anthropology</b> (3)  | Allen, Krulfeld, Grinker, Webster |
|     | Survey of the world's cultures, illustrating the principles of cultural behavior. (Fall and spring)  |                                   |
| 3   | <b>Archaeology</b> (3)   | Humphrey, Brooks, Webster, Benco  |
|     | Introduction to archaeological survey and excavation techniques and laboratory methods of dating and analysis. Brief history of archaeology and survey of world prehistory. Films and laboratory exercises. (Fall and spring)  |                                   |
| 4   | <b>Language in Culture and Society</b> (3)   | Kuipers                           |
|     | Comparison and analysis of how cultures use language to communicate. The relationship of language to issues of human nature, gender, race, intelligence, artistic expression, and power. (Spring)  |                                   |
| 115 | <b>Meso-American Field Program</b> (3 or 6)  | Humphrey, Mergen, Price           |
|     | Same as AmCv/Geog 115. (Summer)  |                                   |
| 146 | <b>Human Variation</b> (3)   | Ubelaker                          |
|     | An overview of human variation, with special emphasis on the skeleton. Includes history of physical anthropology, individual and population variations, archaeological recovery of human remains, paleodemography, growth, paleopathology, and forensic anthropology. Prerequisite: Anth 1. (Spring) |                                   |
| 147 | <b>Hominid Evolution</b> (3)   | Brooks and Staff                  |
|     | The fossil record of hominid evolution considered in the light of evolutionary theory. Brief review of the earlier human antecedents, with concentration on the Pleistocene remains. Laboratory fee, \$15. Prerequisite: Anth 1. (Spring, even years)  |                                   |



- 148 Primatology (3)** Staff  
Physical and behavioral characteristics of the various primate groups and their relationship to human physical and cultural evolution. Frequent meetings at the National Zoological Park. Prerequisite: Anth 1. (Fall)
- 150 Comparative Value Systems (3)** Krulfeld, Webster  
World views, conceptual systems, and value orientations of representative cultures throughout the world.
- 151 Comparative Economic Systems (3)** Krulfeld, Grinker  
The cross-cultural analysis of economic organizations, including hunters and gatherers, herders, cultivators, and peasants; the relationship of economy to ecology and to other aspects of culture; and the impact of the outside world on these economies.
- 152 Cultural Ecology (3)** Humphrey  
Basic principles of cultural ecology. Human interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems.
- 153 Psychological Anthropology (3)** Grinker  
Relevance of psychological theories to human evolution and the cross-cultural study of personality. Cultural determinants of personality formation and mental health. Prerequisite: Anth 2 or permission of instructor. (Spring)
- 154 The Anthropology of Law (3)** Hertz  
Cross-cultural examination of law and judicial systems. Comparison of processes of adjudication and mediation, including the logic of legal arguments, court procedures, and dispute resolution. Prerequisite: Anth 2 or permission of instructor. (Spring)
- 155 Religion, Myth, and Magic (3)** Allen  
Theories of religion developed by anthropologists; survey of world religions with emphasis on preliterate societies; religious processes and change. Same as Rel 155.
- 156 Political Anthropology (3)** Grinker  
Comparative analysis of political systems, including bands, tribes, chiefdoms, and states. Political processes, such as factionalism, styles of leadership, political ritual, and the wider institutional milieu. Prerequisite: Anth 2 or permission of instructor. (Fall, odd years)
- 157 Kinship and Social Structure (3)** Grinker, Allen, Hertz  
Comparative analysis of social patterns and roles in kinship, economic and political organization. Emphasis on preliterate societies, with some attention to complex systems. Prerequisite: Anth 2 or permission of instructor. (Fall)
- 158 Art and Culture (3)** Krulfeld, Humphrey, Allen  
The art of tribal society, including the role of art in culture, influences upon the artist, and beliefs and practices associated with art production.
- 159 Symbol, Cognition, and Society (3)** Allen  
The study of culture through the analysis of symbolic systems including myth, cosmology, folklore, art, ritual, political symbolism, and the symbolic study of kinship. Prerequisite: Anth 2 or permission of instructor. (Fall, odd years)
- 161 Language, Culture, and Experience (3)** Kuipers  
Varieties of linguistic structure; the interrelationship of cognition and verbal behavior; the origin and evolution of human language; verbal organization of perception and emotion. Prerequisite: Anth 4 or permission of instructor. (Fall)
- 162 Discourse, Power, and Performance (3)** Kuipers  
Linguistic variation and change in discourse practices; social and political correlates of linguistic interaction; verbal art. Prerequisite: Anth 4 or permission of instructor. (Spring)
- 163 Ethnographic Film (3)** Allen and Staff  
Still and motion-picture photography as an integral aspect of anthropological research. A study of recent and historic ethnographic films and an introduction to the forms and methods of making visual ethnographic records. Prerequisite: Anth 2 or permission of instructor. Material fee, \$15.
- 165 Introduction to Folklore (3)** Vlach  
Same as AmCv 165.

- 168 Methods of Linguistic Analysis (3)** Kuipers  
Phonetics, grammatical analysis, principles of lexicography, techniques of linguistic reconstruction, and other tools of anthropological linguistic research. (Fall)
- 169 Intensive Study of a Language (3)** Kuipers  
Analytic study of a selected language in its social and cultural context of use. Methods of recording, transcribing, and integrating speech use. Prerequisite: Anth 4. (Spring)
- 170 Cultures of the Caribbean (3)** Griggs and Staff  
Culture history and ways of life among the area's various cultural groups up to the ethnographic present. Prerequisite: Anth 2 or permission of instructor. (Summer)
- 171 North American Native Peoples (3)** Staff  
Comparative study of Indian groups representative of each of the continent's culture areas. Prerequisite: Anth 2 or permission of instructor. (Fall)
- 172 Cultures of South America (3)** Allen  
Comparative study of native American, Iberian, and African cultures of South America and their interactions. Emphasis on world view, interethnic relations, and culture change. Prerequisite: Anth 2 or permission of instructor. (Fall)
- 173 Cultures of the Pacific (3)** Staff  
Culture history and ways of life among native peoples of Melanesia, Micronesia, and Polynesia. Prerequisite: Anth 2 or permission of instructor.
- 175 East Asian Ethnography (3)** Grinker  
Intensive study of the culture and history of selected East Asian peoples. Specific area to be announced in the *Schedule of Classes*. May be repeated for credit. Prerequisite: Anth 2 or permission of instructor.
- 177 Cultures of the Near East (3)** Suthers  
Geographic environment, language, religion, and social structure of settled and nomadic peoples of the Near East: emphasis on the Arab world. Prerequisite: Anth 2 or permission of instructor.
- 178 Cultures of Africa (3)** Grinker, Suthers  
Comparative examination of the history, cultural development, and contemporary problems of sub-Saharan African cultures. Prerequisite: Anth 2 or permission of instructor.
- 182 New World Archaeology (3)** Humphrey  
History of American archaeology; survey of North American culture history from human entry into the Americas during the Pleistocene period until the time of the first European contacts. Prerequisite: Anth 3 or permission of instructor. (Spring)
- 183-84 Old World Prehistory (3-3)** Brooks, Benco  
Survey of human prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of advanced civilizations. Anth 183: Paleolithic and Mesolithic cultures. Anth 184: Neolithic and Bronze Age cultures. Prerequisite: Anth 3. (Academic year)
- 185 Archaeology of Meso-America (3)** Humphrey  
Culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest. Prerequisite: Anth 3 or permission of instructor.
- 186 Archaeology of South America (3)** Allen  
Culture history of pre-Columbian South America, with a focus on the Andes from the Paleo-Indian period through the Spanish Conquest. Prerequisite: Anth 3 or permission of instructor.
- 190 Ethnohistory (3)** Allen, Humphrey  
Reconstruction of the history of a selected preliterate society through the analysis of historical documents, oral traditions, archaeological remains, and other indirect sources. Specific topic to be announced in the *Schedule of Classes*. Same as Hist 190.
- 191 Anthropology in Performance (3)** Garner, Allen  
Exploration of the relationships among social interaction, ritual, and dramatic performance. Improvisation workshops and discussion based on readings about non-Western cultures. Same as TrDa 140.



- 192 Development Anthropology (3)** Staff  
The impact of the world economy on nonindustrial societies. Analysis of the role of anthropology in international development programs aimed at alleviating problems in the Third World. Prerequisite: Anth 2 or permission of the instructor.
- 193 Archaeology Field/Laboratory Research (3)** Brooks, Cressey  
Field and/or laboratory techniques and interpretation. Topics may include excavation methods, recording photography, preservation, stratigraphy and environmental reconstruction, typology, use-wear analysis, and spatial analysis. Specific research area and topics announced in the Summer Sessions Announcement. Same as AmCv 193. (Summer)
- 194 Historical Archaeology (3)** Cressey  
Survey of the basic data and methods of research in the material culture of recent history. Same as AmCv 194. (Spring)
- 195 Undergraduate Research (arr.)** Staff  
Individual research problems to be arranged with a member of the faculty. May be repeated for credit. Prerequisite: Appropriate introductory course or permission of instructor.
- 196 Special Topics (3)** Staff  
Courses offered by visiting faculty; experimental offerings. Topic to be announced in the *Schedule of Classes*. May be repeated for credit. Prerequisite: Anth 2 or permission of instructor.
- 197 Oral History and Interview Techniques (3)** Staff  
Same as AmCv/Hist 197.
- 198 Foundations of Anthropology (3)** Allen, Krulfeld, Griggs  
The development of anthropological thought as seen in historical context. Exploration of selected basic concepts and theories of contemporary anthropology. To be taken in the junior or senior year. Prerequisite: Anth 2 and 3.
- 199 Techniques of Field Research (3)** Staff  
Training in skills for various field situations, including techniques of observation, participation, documentation, and the handling of practical field problems. Intended for those doing research in the United States or abroad or anyone living or working in a foreign culture. Prerequisite: Anth 2 or permission of instructor.
- 200 Methods in Sociocultural Anthropology (3)** Krulfeld  
Approaches to library and field research. Conceptual bases and biases in the delineation of problems and in the selection, analysis, and organization of data. Students will design and carry out their own field projects in the Washington area. Prerequisite: Anth 2 or permission of instructor. (Spring)

#### APPLIED SCIENCE

Interdepartmental course offerings in the School of Engineering and Applied Science.

- 57 Analytical Mechanics I (2)** Jones and Staff  
First half of a one-year sequence. Concepts of statics: force systems, conditions of force and moment equilibrium, simple structures, distributed forces, centroids, internal forces, friction, moments of inertia. Prerequisite or concurrent registration: ApSc 113, Phys 14. (Fall and spring)
- 58 Analytical Mechanics II (3)** Eftis, Haque, and Staff  
Second half of a one-year sequence. Concepts of dynamics: kinematics of particles, velocity and acceleration, translating and rotating reference frames, particle dynamics, motion under central and electromagnetic force, effect of Earth's rotation, vibrations, work, kinetic and potential energy, dynamics of systems of particles. Prerequisite: ApSc 57. (Fall and spring)
- 113 Engineering Analysis I (3)** Esterling, Haque, and Staff  
Analytical methods appropriate to the solution of engineering problems: applications of ordinary differential equations, matrices and determinants, eigenvalues and eigenvectors, systems of ordinary linear differential equations, Bessel and Legendre functions. Prerequisite or concurrent registration: Math 33. (Fall and spring)
- 114 Engineering Analysis II (3)** Kahn and Staff  
Analytical methods appropriate to the solution of engineering problems: complex variables, Fourier series and integral, frequency filters, Laplace transforms.

- inversion and Duhamel integrals; wave partial differential equations. Prerequisite: ApSc 113. (Fall and spring)
- 115 **Engineering Analysis III (3)** Soland and Staff  
Analytical methods appropriate to the solution of engineering problems using concepts from probability and statistics: random variables and their distributions, mathematical expectation, point and confidence interval estimation, hypothesis testing, correlation, regression, and engineering applications. Prerequisite: Math 32. (Fall, spring, and summer)
- 116 **Engineering Analysis IV (3)** Soland and Staff  
Analytical methods appropriate to the solution of engineering problems using advanced concepts from probability and statistics: multivariate distributions, expectation, generating functions, parametric families of distributions, sampling and sufficient statistics, estimation, hypothesis testing, and engineering applications. Prerequisite: ApSc 115, Math 33. (Fall)
- 199 **Honors Research Project and Seminar (3)** Staff  
Student designs and carries out a research project under the supervision of a faculty advisor. Students from all engineering disciplines meet periodically to present projects and discuss results. Enrollment limited to students admitted to the Honors Research Program. May be repeated for credit.

## ART

Professors D.H. Teller, L.F. Robinson (Chair), J.F. Wright, Jr., A.H. Smith, J.L. Lake, T. Ozdogan, M.P. Lader, C.C. Costigan, J.C. Anderson, W.T. Woodward, B. von Barghahn

Professorial Lecturers G. Evans, L. Miller

Associate Professors H.I. Gates, D.M. Hitchcock, S.B. Molina, J.L. Stephanic, K.J. Harts-wick, D. Bjelajac

Adjunct Associate Professor C.R. Rose

Associate Professorial Lecturers D. Srinivasan, J.G. Kauffman, A.B. Barnhart, B.G. Carson, J.F. Harrop, J. Paradiso

Assistant Professor F. Griffith

Assistant Professorial Lecturers E.P. Lawson, M.J. Francis, B.R. Stevens, R. Rodriguez, M. Dennis, J.R. Spencer, M. Hasbun

**Bachelor of Arts with a major in art history**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Art 31–32 and 71 or 72.
3. Required courses in related areas—Art 137; Fren 1–2–3, or Ger 1–2, 3–4.
4. Required courses in the major—Art 101 and 102, 104 or 105, 106 or 107, 108, 109 or 110, 113 or 114, 117 or 118, 129; 9 additional credit hours in 100-level art history courses.

**Bachelor of Arts with a major in fine arts**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. A total of 51 hours of art courses is required of fine arts majors except for students with a concentration in photography and visual communication, for whom 54 hours are required.
3. Required basic fine arts courses: Art 21–22 and 41–42.
4. Required courses in art history: Art 31–32; 6 additional credit hours in 100-level art history courses.
5. Required fine arts courses in the major:
  - a. 12 hours, exclusive of primary area of concentration, in four of the following eight areas—ceramics, advanced drawing, advanced design, printmaking, painting, photography, sculpture, and visual communication.
  - b. 15 hours to be taken in the primary area of concentration (except for photography and visual communication).
  - c. 18 hours for students concentrating in photography: Art 23, 24, 181, 182, 205, 206.
  - d. 18 hours for students concentrating in visual communication: Art 163, 164, and four courses chosen in consultation with the advisor.



6. Nine additional hours of electives may be taken in the Art Department, except for students concentrating in photography, who take only 6 hours of electives in the Art Department.

7. Transfer students must take at least 12 credit hours of 100-level fine arts courses and 9 credit hours in their area of specialization at this University.

*Bachelor of Arts with a combined major in art history and fine arts*—The following requirements must be fulfilled in consultation with the departmental advisor:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. A total of 30 hours in art history and 30 hours in fine arts.

a. Art history: Art 31–32, 71 or 72, and one course in each of the following areas—ancient, medieval, Renaissance, seventeenth and eighteenth centuries, nineteenth and twentieth centuries; 6 hours of art history electives.

b. Fine arts: Art 21–22, 41–42. The remaining 18 hours may be in one area of concentration or a combination of areas.

*Bachelor of Arts with a major in classical archaeology and anthropology*—An interdepartmental major offered by the Art and Anthropology Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Required courses in other areas: 6 credit hours, or equivalent, of introductory French, German, Latin, Greek, or a Near Eastern language. A second year of language study is strongly encouraged. Since graduate study in classical archaeology usually involves broader preparation and requires knowledge of at least one classical and one modern language, students intending to pursue graduate study should consult with the departmental advisor as early as possible.

3. Required courses in the major: Anth 3, 183–84, and one course chosen from Anth 152, 158, 177, or an approved 3-hour course in field work; four courses chosen from Art 101, 102, 103, 112, 155; two courses chosen from Clas 71, 72, 107, 113, 170; two courses chosen from Hist 107, 108, 109, 110 (students electing Hist 108 should previously have completed Hist 107 or 109).

*Bachelor of Arts with a major in classical archaeology and classics*—An interdepartmental major offered by the Art and Classics Departments. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Clas 1–2, 3, 4; or Clas 11–12, 13–14.

3. Required courses in the major—Art 101, 102, 112, 155; three courses selected from Hist 107, 108, 109, 110, 209; 6 credit hours in second-group courses in Greek or Latin (a reading knowledge of French and German is recommended).

*Five-Year Bachelor of Arts/Master of Arts in the field of art therapy*—A program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. The first three years of the program consist of undergraduate course work. Application for admission to the M.A. program in art therapy will be made during the second semester of the third year; for admission to the graduate portion of the program, acceptance must be obtained prior to the start of the fourth year of the program. If acceptance to the M.A. program in art therapy is not desired or not obtained, the requirements for the B.A. degree in the undergraduate field chosen may be fulfilled by the successful completion of appropriate courses during the fourth year of study. If acceptance into the M.A. program in art therapy is obtained, the B.A. will be awarded after the successful completion of the fourth year of the program. Study during the summer following the award of the bachelor's degree and the following academic year would normally complete the M.A. degree requirements.

The following requirements must be fulfilled:

1. Students must meet the general requirements stated under Columbian College and Graduate School of Arts and Sciences. (See the Graduate Programs Bulletin also.)

2. The course requirements for the B.A. in either fine arts or psychology and for the M.A. in art therapy must be met.

*Special Honors*—For graduation with Special Honors, students must have attained a grade-point average of at least 3.5 in the major and 3.0 overall. No later than the beginning of

the senior year, students should consult their advisor regarding eligibility and selection of an area of study and a director of the research or creative arts project.

**Minor in Art History**—Required: 18 credit hours of courses in art history, chosen in consultation with the undergraduate advisor for art history.

**Minor in Fine Arts**—Required: 18 credit hours of general course work in fine arts or in an area of concentration selected from design, drawing, ceramics, photography, painting, printmaking, sculpture, or visual communication. Students in the general program should consult the undergraduate fine arts advisor. Those selecting a specific area should consult with an advisor in the area of concentration.

**Combined Minor in Art History and Fine Arts**—Required: 9–12 hours of course work in art history and 9–12 hours in fine arts, for a total of 21 hours. A program of study is developed in consultation with the undergraduate advisors in art history and fine arts.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

## ART HISTORY

- |       |  |                    |
|-------|--|--------------------|
| 1     | <b>Principles of Art (3)</b>   | von Barghahn       |
|       | An introduction to various art media, basic elements of art and thematic interpretations, European and non-Western traditions. (Fall and spring)   |                    |
| 31–32 | <b>Survey of Western Art (3–3)</b>   | Robinson and Staff |
|       | A foundation for further study in the history of art. Art 31: prehistoric to Gothic art. Art 32: proto-Renaissance to modern art. (Art 31 and 32—fall and spring)  |                    |
| 71    | <b>Introduction to the Arts in America I (3)</b>   | Bjelajac           |
|       | Painting, sculpture, and architecture from the Colonial period to the Civil War. Emphasis on the political and cultural problem of formulating a national style and iconography. Major focus on Washington public art and architecture. (Fall and spring)  |                    |
| 72    | <b>Introduction to the Arts in America II (3)</b>  | Bjelajac           |
|       | Painting, sculpture, and architecture from the Realism of Homer and Eakins to feminist and postmodern art. Issues of the theory of an avant garde and government patronage and censorship. (Fall and spring)   |                    |
| 101   | <b>Greek Art and Archaeology (3)</b>   | Hartswick          |
|       | A survey of Greek sculpture, painting, and architecture, from the Dark Ages (ca. 1000 B.C.) through Alexander the Great (ca. 300 B.C.). Emphasis is on the stylistic development of Greek art and the interrelationships among sculptural technique and style, major changes in vase painting, and the refinements of architectural elements. (Fall) |                    |
| 102   | <b>Roman Art and Archaeology (3)</b>   | Hartswick          |
|       | A survey of Roman sculpture, painting, and architecture, from 300 B.C. (the Etruscans) to the end of the Constantinian Period (ca. 300 A.D.). The major artistic achievements of the Romans—portraiture, historical narratives—and the stylistic changes from the idealized and illusionistic to the realistic and abstract. (Spring)                |                    |
| 103   | <b>The Ancient Artist and His Workshop (3)</b>   | Hartswick          |
|       | A study of the ancient craftsman's techniques, workshop organization, and position in society. Exploration of sculpture, architecture, painting, pottery, mosaics, gems, glass, and metalwork.   |                    |
| 104   | <b>Renaissance Art in Italy I (3)</b>  | Evans              |
|       | Early developments from the 13th to the 15th century. (Fall)   |                    |
| 105   | <b>Renaissance Art in Italy II (3)</b>   | Evans              |
|       | High Renaissance and Mannerism. (Spring)   |                    |
| 106   | <b>Renaissance Art in the North I (3)</b>  | Hitchcock          |
|       | Northern painting from van Eyck through Bosch. (Fall)  |                    |
| 107   | <b>Renaissance Art in the North II (3)</b>   | Hitchcock          |
|       | Northern painting and graphics from Durer through Brueghel. (Spring)   |                    |
| 108   | <b>18th-Century Art in Europe (3)</b>  | Hitchcock          |
|       | Painting, sculpture, and architecture in France, Great Britain, and Italy. Emphasis on Watteau, Chardin, David, Hogarth, Gainsborough, Reynolds, Canaletto, and Tiepolo. (Spring)  |                    |



- 109 19th-Century Art in Europe I (3)** Robinson  
Examination of Neoclassicism and Romanticism in the context of Western European political, social, and cultural developments. Emphasis on France, England, and Germany and the representative styles of David, Ingres, Delacroix, Turner, Constable, and Friedrich. (Fall)
- 110 19th-Century Art in Europe II (3)** Robinson  
Examination of the revolution in style of Realism, Impressionism, and Post-impressionism in the context of Western European political, social, and cultural developments. Emphasis on representative styles of Courbet, Manet, Monet, Morisot, Degas, Seurat, Cezanne, Van Gogh, and Gauguin. (Spring)
- 111 Classical Archaeology (3)** Hartawick  
Archaeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts.
- 112 Egypt and the Near East (3)** Hartawick  
The great artistic tradition of the Nile Valley and the contemporary civilizations (ca. 3000 B.C. to after 1000 B.C.) between the rivers Tigris and Euphrates (present day Iraq) are explored. Emphasis on the Pyramid Age, the temples at Karnak and Luxor, the tombs of the Valley of the Kings, and the artistic traditions of the Sumerians, Akkadians, Babylonians, Assyrians, and Persians. (Fall)
- 113 Baroque Art in the South (3)** von Barghahn  
Tradition and innovation in Italian and Spanish art. Artists considered include Caravaggio, the Carracci, Borromini, Bernini, El Greco, Zurbaran, Ribera, Velasquez, and Murillo. (Spring)
- 114 Baroque Art in the North (3)** Hitchcock  
Concentration on France, Flanders, and Holland, with emphasis on Poussin, Rubens, Van Dyck, and Rembrandt. (Fall)
- 115 Christian Iconography (3)** Evans  
Origins and development of Christian symbols and themes from early Christian to the Council of Trent.
- 117 Medieval Art I (3)** Anderson  
Early Christian and Byzantine. (Fall)
- 118 Medieval Art II (3)** Anderson  
Romanesque and Gothic. (Spring)
- 119 Islamic Religion and Art (3)** Nasr  
Same as Rel 163.
- 120 East Asian Art (3)** Srinivasan  
May be repeated for credit when content differs.
- 121 Spanish Art I (3)** von Barghahn  
Discussion of areas selected from the art of ancient Iberia through the seventeenth century. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.
- 122 Spanish Art II (3)** von Barghahn  
Discussion of areas selected from the eighteenth through twentieth centuries. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.
- 129 20th-Century Art in Europe (3)** Lader  
Survey of 20th-century European painting, sculpture, and architecture, from their origins in the late 19th century through Surrealism. Emphasis on major modernist movements and artists, including Matisse, Picasso, Kandinsky, and Mondrian. (Fall)
- 130 20th-Century American Art (3)** Lader  
Survey of 20th-century American painting and sculpture, focusing upon the avant garde. Emphasis on artists of the Stieglitz circle and later modernist movements such as Abstract Expressionism, Pop, Op, Minimal, and Conceptual art. Art 129 is recommended as preparation. (Spring)
- 145 Folk Arts in America (3)** Staff  
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. Same as AmCv 145.
- 147 Primitive Art I: Ancient Civilizations of Mexico and Latin America (3)** von Barghahn  
Survey of Pre-Columbian art and architecture from prehistoric period to the Spanish conquest, including Yucatan and Central American regions.

- 148 **19th-Century American Art I: Age of Democratic Revolution** (3) Bjelajac  
Contextual examination of painting and sculpture from the American Revolution to the Civil War, incorporating issues of national identity, democracy, religion, race and ethnicity, class and gender. (Fall)
- 149 **19th-Century American Art II: Origins of Modernism** (3) Bjelajac  
Painting, sculpture, and photography from the Civil War to the Alfred Stieglitz group and the Armory show. Issues of women in the arts, the Arts and Crafts movement, the formation of an American avant garde, and African-Americans in the arts. (Spring)
- 150 **Internship in Art History** (3) Staff  
Open to candidates for the B.A. in art history only and with the approval of advisor in art history.
- 155 **Aegean Civilizations** (3) Hartswick  
An introduction to the excavational and multidisciplinary aspects of classical archaeology. Minoan and Mycenaean civilizations (1700–1200 B.C.). Interrelationships between Greek and Persian cultures of the sixth and fifth centuries B.C. (Spring)
- 156 **Medieval Sculpture** (3) Anderson, Evans  
In-depth study of sculpture of Early Christian period, Carolingian era, or High Middle Ages. Seminar format.
- 161 **Studies in Renaissance Art** (3) Evans
- 162 **Principles of Museum Work** (3) Lawson  
Introduction to the history and development of museums; problems of museum administration, connoisseurship, cataloguing, installation, conservation, and educational service.
- 165 **Primitive Art II: African, Oceanic, North American Indian** (3) von Barghahn  
Survey of architecture, sculpture, and painting from ancient kingdoms to early 20th-century culture. Emphasis on imagery and iconography.
- 167 **The Dynastic Courts of Europe** (3) von Barghahn  
Politics and royal patronage, 1400–1800. Areas may include France, Italy, Spain, Portugal, Austria, Germany, or Russia. Specific area announced in *Schedule of Classes*. May be repeated for credit if specific area is different.
- 169 **History of Decorative Arts: European Heritage** (3) Carson  
Survey of changing styles of European furniture, textiles, ceramics, and glass, in the context of general trends in art history and changing patterns in economic, technological, social, and cultural history. From antiquity to the modern age. (Fall)
- 170 **History of Decorative Arts: American Heritage** (3) Carson  
Examination of the decorative arts in America from the 17th century to the modern period. Exploration of changing visual characteristics in relation to the changing American experience. (Spring)
- 173 **History of the Cinema** (3) Staff  
Same as Comm 173. Laboratory fee, \$35.
- 176 **American Architecture** (3) Longstreth  
Same as AmCv 175.
- 191 **American Architecture** (3) Longstreth  
Same as AmCv 176.
- 192 **The American Cinema** (3) Staff  
Same as AmCv 192.
- 197 **History of Photography** (3) Lader
- 198 **Studies in Art History** (3) Staff  
Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

## FINE ARTS

**Note:** Fine arts courses at the 100 level may be repeated for credit with approval of the department. Schedule of fees for Art 123–24: Ceramics—\$75; 2-D Design—\$24; 3-D Design—\$27; Drawing—\$75; Printmaking—\$36; Sculpture—\$27; Typography—\$75; Oil and Acrylic Painting—none; Watercolor—\$45; Photography—\$100; Visual Communication—\$75; Lithography—\$48; Serigraphy—\$75; Jewelry Design—\$36.



- 21-22 Design I: Basic (3-3)** Costigan, Teller, Stephanie  
Required of all Fine Arts majors. Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. Art 21: Laboratory fee, \$24. Art 22: Laboratory fee, \$27. (Art 21 and 22—fall and spring)
- 23 Photography I: Introduction (3)** Lake and Staff  
Introduction to the principles of exposure and development of films and papers. Emphasis on creative expression. Laboratory fee, \$100. (Fall and spring)
- 24 Photography II (3)** Lake and Staff  
Continuation of Art 23. Experimentation with black and white films and developers. Improvement of printing and exposure techniques. Emphasis on control for creative expression. Prerequisite: Art 23. Laboratory fee, \$100. (Fall and spring)
- 41-42 Drawing I (3-3)** Wright and Staff  
Elementary investigation of concepts of drawing, both traditional and contemporary; training in perception, analysis of form in light and space; instruction in the use of graphic materials and media; exercises in connoisseurship. Material and model fee, \$75 per semester. (Art 41 and 42—fall and spring)
- 51 Introduction to Handbuilt Ceramics (3)** Ozdogan and Staff  
Working with clay as an art form. Exploration of pinch, coil, slab, hump and press mold, paddling, and hollowing techniques. Sketch studies, reduction and oxidation kiln firings, clay and glaze making. Laboratory fee, \$75, including unlimited materials and use of tools. (Fall and spring)
- 52 Introduction to Wheelthrown Ceramics (3)** Ozdogan and Staff  
Development of cylindrical and open forms. Trimming, clay and glaze making, reduction and oxidation kiln firings. Sketch studies. Laboratory fee, \$75, including unlimited materials and use of tools. (Fall and spring)
- 57 Printmaking: Introduction to Relief and Planographic Techniques (3)** Griffith  
Exploration in monochrome and color of basic methods of these techniques, i.e., woodcut, composite relief, monotype, and lithography. Emphasis on aesthetic qualities of prints. Laboratory fee, \$36. (Fall)
- 58 Printmaking: Introduction to Intaglio and Stencil Techniques (3)** Griffith  
Exploration in monochrome and color of basic methods of these techniques, i.e., etching, engraving, collograph, stencil, and composite intaglio. Laboratory fee, \$36. (Spring)
- 61-62 Water Color (3-3)** Teller  
Painting in transparent and opaque water color and in acrylic. Experimentation, figurative, and landscape. Laboratory fee, \$45 per semester. (Academic year)
- 65-66 Painting I (3-3)** Smith and Staff  
Emphasis on personal expression with exposure to a variety of styles. Application of design principles to easel painting. Material and model fee, \$39 per semester. (Academic year)
- 81-82 Sculpture I (3-3)** Gates  
Beginning study of design and fabrication of sculpture. Basic sculptural techniques for media, including clay, plaster, stone, and wood. Laboratory fee, \$27 per semester. (Academic year)
- 123-24 Individual Problems (3-3)** Staff  
Emphasis on problems and materials of specific interest to the student in any area of Fine Arts. Laboratory fee depending on area chosen. Prerequisite: permission of instructor. (Academic year)
- 125-26 Painting II (3-3)** Smith  
Alteration of personal expression and structured problems dealing with still life and the figure. Use of acrylic and oil. Material and model fee, \$39 per semester. (Academic year)
- 127-28 Painting III (3-3)** Woodward  
Studies in the interpretation of the figure and still life. Emphasis on color, space, planes, modulations. Alla prima and mixed techniques. Material and model fee, \$39 per semester. (Academic year)

- 131 Intermediate Ceramics:** Ozdogan and Staff  
**Wheelthrown Functional Forms (3)**  
 Aesthetic and technical development of wheelthrown functional ceramic forms. Exploration of attachments: lids, spouts, handles, and footing devices. Sketches and technical drawings, clay and glaze-making tests, varied temperature firings in reduction and oxidation atmospheres. Laboratory fee, \$75. (Fall and spring)
- 132 Intermediate Ceramics:** Ozdogan and Staff  
**Wheelthrown Nonfunctional Forms (3)**  
 Aesthetic and technical development of wheelthrown ceramic sculptural forms. Emphasis on section throwing, closed forms, and construction. Varied temperature firings in oxidation and reduction atmospheres. Clay and glaze making. Laboratory fee, \$75. (Fall and spring)
- 133 Ceramic Decoration (3)** Ozdogan  
 Aesthetic and technical development of surface decoration, with experimental projects in sgraffito, mishima, engobe, majolica, underglaze, overglaze, and relief techniques. Laboratory fee, \$75.
- 134 Nonsilver Printing Processes in Photography (3)** Staff  
 Introduction to nonsilver and archaic photographic processes. At least three processes will be explored. Emphasis on creative expression. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$100. (Spring)
- 135-36 Advanced Water Color (3-3)** Teller  
 Development of techniques of water color: concentration on special projects. Laboratory fee, \$45 per semester. (Academic year)
- 137 Workshop in Materials, Methods, and Techniques (3)** Woodward, Smith, and Staff  
 Technical investigation of painting methods from the 14th century to the present. Preparation of grounds, media, underpainting, glazing. Laboratory fee, \$15. (Fall and spring)
- 138 Printmaking: History and Practice (3)** Griffith  
 Lecture survey through slides and original prints of the history of the fine art etching, engraving, woodcut, stencil, and lithograph. Laboratory demonstrations with student participation. This basic course is designed for artists, art historians, art dealers, appraisers, librarians, commercial artists, and collectors. There is no prerequisite. Laboratory fee, \$24. (Summer)
- 139 Problems in Color (3)** Costigan  
 Intensive exploration of the subjective experience and objective rationale of color through the execution of problems in color contrast and color scales. (Spring)
- 141 Interior Design (3)** Teller  
 Survey of basic interior design materials and techniques. Topics include floor plans and design, interior renderings, hard and soft materials, furniture styles. Laboratory fee, \$21. (Fall)
- 142 Interior Design Problems (3)** Teller and Staff  
 A theoretical and practical in-depth exploration of a specific area of interior design selected from furniture design, construction and restoration, history of furnishings, and interior rendering. Topic to be announced in the Schedule of Classes. Prerequisite: Art 141 or equivalent. Laboratory fee, \$21. (Spring)
- 143-44 Serigraphy (3-3)** Teller  
 Fine arts printmaking using serigraphic techniques. Utilization of all basic techniques; emphasis on aesthetic properties of prints. Laboratory fee, \$54 per semester. (Academic year)
- 146 Ceramic Restoration (3)** Ozdogan  
 Methods and techniques for museum and commercial application. Laboratory fee, \$75. (Summer)
- 151 Ceramic History and Technology (3)** Staff  
 Emphasis on clay and glaze formulation and firing techniques, with related historical background. Laboratory fee, \$75. (Fall)
- 152 Ceramic Sculpture (3)** Ozdogan  
 Developing an understanding of the sculptural ceramic form that integrates both quality and creativity. Techniques in hollow and solid construction. Varied temperature firings in reduction and oxidation atmospheres. Laboratory fee, \$75. (Fall)



- 153 Printmaking: Intermediate Study of Intaglio and Relief Techniques (3)** Griffith  
Investigation in monochrome and color of these techniques, i.e., etching, engraving, woodcut, wood engraving, stencil, composite processes, and mixed media. Prerequisite: Art 57, 58. Laboratory fee, \$36. (Fall)
- 154 Printmaking: Introduction to Light-Sensitive Grounds (3)** Griffith  
Exploration of the use of grounds on copper that are sensitive to light for the purpose of etching. Printing in monochrome and color. Prerequisite: Art 153 or equivalent. Laboratory fee, \$36. (Spring)
- 157-58 Printmaking: Advanced Study of Intaglio and Relief Techniques (3-3)** Griffith  
Intensive exploration in monochrome and color of printmaking: etching, engraving, woodcut, wood engraving, stencil, collograph printing with light-sensitive grounds, composite techniques, and mixed media. Emphasis on utilization of techniques in developing a personal statement and style. Prerequisite: Art 153, 154, or equivalent. Laboratory fee, \$36. (Fall and spring)
- 159-60 Drawing II (3-3)** Wright and Staff  
Study and application of master drawing techniques. Investigation of perspective and anatomy. Emphasis upon conceptual development of personal style. Material and model fee, \$75 per semester. (Academic year)
- 163 Visual Communication I: Basic Layout (3)** Molina and Staff  
Layout stages, including basic formats, production processes; working with type and basic skills. Prerequisite: Art 171. Laboratory fee, \$75.
- 164 Visual Communication II: Problem Solving (3)** Molina and Staff  
Conceptual approach to problem solving. Various graphic design problems, including both small-format and large-format design in commercial and institutional graphics. Prerequisite: Art 163, 172. Laboratory fee, \$75.
- 166 Advanced Drawing Techniques (3)** Smith and Staff  
Specific area announced in the *Schedule of Classes*. May be repeated for credit if the area covered is different. Laboratory fee, \$75.
- 168 Intermediate Ceramic Design in Handbuilding (3)** Ozdogan  
Further concentration in handbuilding techniques of pinch, coil, slab, hump and press mold, paddling, and hollowing. Sketch studies, clay and glaze tests. Orientation to studio operations and maintenance. Laboratory fee, \$75. (Fall and spring)
- 171 Typography I (3)** Molina and Staff  
Basic calligraphy for traditional and contemporary use. Type theory, including specification, copy fitting, and study of letter form as used in graphic design. Laboratory fee, \$75.
- 172 Typography II (3)** Molina and Staff  
Study of type classification, recognition, and adaptation. Methods of type specification, copy fitting, and typesetting processes. Typographic layout and alphabet design. Prerequisite: Art 171. Laboratory fee, \$75.
- 174 Visual Communication III: Computer Graphics Seminar (3)** Molina and Staff  
Introduction to computer graphics for art majors. The use of computers in the design process and as a tool for problem solving in graphic design. Laboratory fee, \$75.
- 175 Printmaking: Introduction to Lithography (3)** Barnhart  
Study of planographic techniques and materials related to printing images from stones and metal litho plates. Prints in crayon, tonal washes, and multicolor. Laboratory fee, \$48.
- 179-80 Sculpture II (3-3)** Gates  
Expansion of Sculpture I, utilizing advanced wood milling equipment and metal welding techniques. Prerequisite: Art 81-82. Laboratory fee, \$27.
- 181 Introduction to Color Photography (3)** Lake  
Introduction to color through exposure and processing of color transparency films. Use of filters for creating and correcting color shifts, with emphasis on color as subject matter. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$100. (Fall)

- 182 Introduction to Photographic Lighting (3)** Staff  
Introduction to various lighting techniques. Available light manipulation, studio lighting, and copy lighting will be explored. Emphasis on creative expression. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$100. (Fall and spring)
- 183 Experimental Photography (3)** Staff  
Structured exploration of various photographic processes and techniques. Emphasis on creative expression. Content of course will vary; contact department for current offering. Prerequisite: Art 23 and 24 or permission of instructor. Laboratory fee, \$100. (Fall and spring)
- 184 Jewelry Design and Techniques (3)** Gates  
Laboratory fee, \$36. (Fall and summer)
- 186 Portrait Painting and Drawing (3)** Staff  
Model fee, \$45.
- 189-90 Sculpture III (3-3)** Gates  
Advanced study in concepts and materials through creation of three-dimensional forms concentrating on relevance of scale and media. Relationship of sculpture to the environment. Prerequisite: Art 179-80. Laboratory fee, \$27 per semester. (Academic year)
- 193 Computer Design in the Fine Arts I (3)** Stephanie  
Exploration of the use of computers as a visual arts medium. Topics include bit-mapped painting, object-oriented drawing, Postscript drawing, and image scanning manipulation. Emphasis on creative expression. Laboratory fee, \$75.
- 194 Computer Design in the Fine Arts II (3)** Stephanie  
Continuation of Art 193, with an emphasis on individual approach. Prerequisite: Art 193 or permission of instructor. Laboratory fee, \$75.

## ASTRONOMY

See **Physics**.

## BIOLOGICAL SCIENCES

Professors S.O. Schiff, D.L. Atkins, R.K. Packer (Chair), R. Donaldson, T.L. Hufford  
 Professorial Lecturer R.P. Eckerlin  
 Associate Professors R.E. Knowlton, H. Merchant, D.E. Johnson, J.R. Burns, K.M. Brown,  
 D.L. Lipscomb  
 Associate Professorial Lecturer P.E. Spiegler  
 Assistant Professors E.F. Wells, D.W. Morris

*Bachelor of Arts with a major in biology*—The following requirements must be fulfilled:

1. The general requirements stated under **Columbian College and Graduate School of Arts and Sciences**.
2. **Prerequisite courses—BiSc 11-12, or equivalent.**
3. Chem 11-12; Chem 151-52 and 153-54, or Chem 50. (The following courses are strongly recommended: Phys 1, 2, 5, and 6; 3 credit hours of either mathematics or statistics; two years of an approved foreign language.)
4. Required courses for the major—A minimum of 24 credit hours of 100-level courses, which must include at least 4 hours from each of the following: cell and molecular biology, suborganismal biology, organismal biology, and ecology and evolution.

*Bachelor of Science with a major in biology*—The following requirements must be fulfilled:

1. The general requirements stated under **Columbian College and Graduate School of Arts and Sciences**.
2. **Prerequisite courses—BiSc 11-12, or equivalent.**
3. Required courses in related areas—Chem 11-12; Chem 151-52 and 153-54; Phys 1, 2, 5, and 6; 3 credit hours of either mathematics or statistics (this requirement cannot be satisfied by waiver). Two years of an approved foreign language are strongly recommended but not required.
4. Required courses for the major—A minimum of 30 credit hours of 100-level courses, which must include at least 4 hours from each of the following: cell and molecular biology, suborganismal biology, organismal biology, and ecology and evolution.



A maximum of 6 credit hours of research and independent study or graduate courses in biological sciences may be used as electives within the major.

**Special Honors**—In addition to the general requirements stated under University Regulations, in order to be considered for graduation with special honors, a student must maintain a cumulative 3.5 grade-point average in biological science courses and at least a 3.0 cumulative overall grade-point average. Students who meet these criteria and wish to pursue special honors must complete a laboratory research project under faculty direction.

**Minor in biology**—12 credit hours of 100-level courses (excluding research and independent study).

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** BiSc 11–12 or equivalent is prerequisite to all 100-level courses except by permission of the instructor.

### INTRODUCTORY BIOLOGY

- 3–4 **Introductory Biology for Nonscience Majors** (3–3) Schiff  
Lecture (2 hours), laboratory (2 hours). BiSc 3: Principles of cell biology; structure and function of plants and animals; animal behavior. BiSc 4: Human anatomy and physiology; genetics; evolution; ecology. It is recommended that BiSc 3 be taken before BiSc 4. Laboratory fee, \$35 per semester. (Academic year)
- 11–12 **Introductory Biology for Science Majors** (4–4) Hufford  
Lecture (3 hours), laboratory (3 hours). BiSc 11: Principles of cell and molecular biology, cell physiology, inheritance, and evolution. BiSc 12: Principles of organismic biology, including diversity, form and function of plants and animals, and ecology. Prerequisite to BiSc 12: BiSc 11. Laboratory fee, \$45 per semester. (Academic year)

### CELL AND MOLECULAR BIOLOGY

- 102 **Cell Biology** (3) Morris  
Structure and function of biological molecules and cellular organelles; cellular interactions, cell differentiation. Prerequisite: one semester of organic chemistry. (Spring)
- 103 **Cell Biochemistry** (3) Donaldson  
Introduction to the metabolism of generalized cells of animals, plants, and microorganisms, including energetics, enzymes, respiration, biosyntheses, and regulatory mechanisms. Prerequisite: one semester of organic chemistry. (Fall)
- 104 **Cell Biochemistry Laboratory** (1) Donaldson  
Designed to illustrate some of the principles and techniques of biochemical experimentation. Prerequisite or concurrent registration: BiSc 102 or 103. Laboratory fee, \$45. (Fall)
- 107 **Genetics** (3) Johnson  
Introduction to genetics, with emphasis on the integration of transmission of genetic traits and the molecular basis of gene action. Also includes cytogenetics, gene regulation, and examples of current applications of genetic technology. (Fall and spring)
- 108 **Genetics Laboratory** (1) Johnson  
Study of genetic principles and genetic and molecular techniques in *Drosophila* and *E. coli*. Prerequisite or concurrent registration: BiSc 107. Laboratory fee, \$45. (Spring)
- 109 **Advanced Genetics** (3) Johnson  
Emphasis on the use of genetic analysis in solving modern biological problems. Gene expression and its control; genes in development and oncogenes. Prerequisite: introductory course in genetics. (Spring)

## SUBORGANISMAL BIOLOGY

- 110 Developmental Plant Anatomy (4)** Hufford  
Demonstration, observation, discussion (6 hours). Initiation and ontogeny of tissues and organs of vascular plants. Laboratory fee, \$45. (Spring, odd years)
- 112 Plant Physiology (4)** Donaldson  
Lecture (2 hours), laboratory (4 hours). Physiology of seed plants with emphasis on growth, development, reproduction, and metabolism. Prerequisite: Chem 11-12. Recommended: Chem 50 or 151. Laboratory fee, \$45. (Spring)
- 114 Developmental Biology (4)** Brown  
Lecture (2 hours), laboratory (4 hours). Embryonic development of animals. Principles are illustrated by modern experimental studies of developmental problems. Laboratory analysis of organ system formation in the frog, chick, and pig. Laboratory fee, \$45. (Fall)
- 115 Experimental Developmental Biology (4)** Brown  
Lecture (2 hours), laboratory (4 hours). Biochemistry and cellular biology of development. Laboratory exercises involve micromanipulative and biochemical operations on embryos fertilized in the lab. Prerequisite: BiSc 114 or equivalent, or permission of instructor. Laboratory fee, \$45. (Spring)
- 118 Histology (4)** Burns  
Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Laboratory fee, \$45. (Spring)
- 120 Survey of Neurobiology (4)** Atkins  
Lecture (3 hours), laboratory (2 hours). Study of the gross and cellular anatomy, physiology, and biochemistry of the nervous system and its pathways; emphasis on mammals. Laboratory fee, \$45. (Fall)
- 121 Comparative Endocrinology (4)** Burns  
Lecture (3 hours), laboratory (2 hours). Comparative study of basic principles of chemical integration, neuroendocrine relationships, and mechanisms of hormone action. Prerequisite: BiSc 118 or 124. Laboratory fee, \$45. (Fall)
- 122 Human Physiology (3)** Packer  
Introduction to the function of organ systems of the human body. Prerequisite: Chem 11-12. (Fall)
- 123 Human Physiology Laboratory (1)** Staff  
Study of basic physiology laboratory techniques; emphasis on the experimental study of homeostatic mechanisms in humans. Prerequisite or concurrent registration: BiSc 122. Laboratory fee, \$45. (Fall)
- 124 Advanced Human Physiology (4)** Packer  
Lecture (3 hours), laboratory (3 hours). Detailed study of selected organ systems, stressing chemical and physical bases. Prerequisite: BiSc 122 and 123, or equivalent. Prerequisite or concurrent registration: Chem 151-52 or 50. Laboratory fee, \$45. (Spring)
- 126 Radiation Biology (3)** Schiff  
Chemical, physical, and biological aspects of radiation; effects of radiation on cells and organisms, with emphasis on mammals. Recommended: cell biology and chemistry or physics. (Fall)
- 128 Human Nutrition (3)** Staff  
Dietary requirements and their underlying physiological and biochemical bases; composition of natural and modified foodstuffs and additives; social and economic aspects of nutrition. (Spring)

## ORGANISMAL BIOLOGY

- 130 Invertebrate Zoology (4)** Knowlton  
Lecture (3 hours), laboratory (3 hours). General survey of invertebrate animals, including classification, morphology, physiology, embryology, and evolutionary relationships among phyla. Laboratory fee, \$45. (Fall)
- 132 Comparative Vertebrate Anatomy (4)** Atkins  
Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of Phylum Chordata, stressing recent forms. Laboratory fee, \$45. (Spring)



- 135 Plant Diversity (4)** Staff  
 Demonstration, observation, discussion (6 hours). Evolutionary morphology and life histories as a basis for a phylogenetic study. Laboratory fee, \$45. (Spring, odd years)
- 137 Introductory Microbiology (4)** Morris  
 Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic relationships, and biotechnology. Prerequisite: one year of chemistry. Laboratory fee, \$45. (Fall)
- 139 Parasitology (4)** Eckerlin  
 Lecture (2 hours), laboratory (4 hours). Introduction to animal parasitology: survey of parasitic types from protozoa through arthropods. Laboratory fee, \$45. (Fall)
- 140 Taxonomy of Flowering Plants (4)** Wells  
 Lecture (2 hours), laboratory and field (4 hours). Origin, evolutionary development, and principles of systematics of flowering plants. Laboratory fee, \$45. (Spring)
- 142 Flora of the Mid-Atlantic States (4)** Wells  
 Field trips and laboratory study of the identification and ecology of vascular plants of the Coastal Plain, Piedmont, and mountains of Delaware, Maryland, Virginia, and West Virginia. Emphasis on family characteristics and recognition of dominant species in native habitats. Laboratory fee, \$45. (Summer)
- 145 Ornithology (4)** Staff  
 Lecture (2 hours), laboratory and field (4 hours). An introduction to the study of birds from an ecological perspective. Includes several short field trips, two full-day Saturday trips for waterfowl and migrants, and one evening field trip for owls. Laboratory fee, \$45. (Spring)

## ECOLOGY AND EVOLUTION

- 150 Organic Evolution (3)** Lipscomb  
 Synthetic theory of organic evolution, including population biology, speciation, adaptation, macroevolution, systematics, biogeography, and the geologic record. (Fall)
- 152 Animal Behavior (3)** Staff  
 An evolutionary approach to the study of animal behavior, emphasizing behavioral ecology and sociobiology. (Spring)
- 154 General Ecology (4)** Merchant  
 Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and energy transfer and their relationship to the structure and function of population, species, communities, and ecosystems. Laboratory fee, \$45. (Fall)
- 155 Plant Ecology (4)** Staff  
 Lecture (2 hours), laboratory (4 hours). Introduction to the dynamics of plant populations, communities, and individuals. One weekend field trip required. Because of conflicting field-trip schedules, concurrent registration in BiSc 158 is not allowed. Laboratory fee, \$45. (Fall)
- 156 Animal Ecology (4)** Merchant  
 Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: BiSc 154 or permission of instructor. Laboratory fee, \$45. (Spring, even years)
- 157 Aquatic Ecology (4)** Merchant  
 Lecture (3 hours), laboratory and field (3 hours). Ecological principles applied to aquatic systems with special references to physiochemical properties, typical habitats, and communities. Laboratory fee, \$45. (Spring, odd years)
- 158 Field Botany (4)** Wells  
 Lecture (2 hours), laboratory and field (4 hours). Field and laboratory studies on local flora. Two weekend field trips required. Because of conflicting field-trip schedules, concurrent registration in BiSc 155 is not allowed. Laboratory fee, \$45. (Fall)
- 167 Marine Biology (4)** Knowlton  
 Lecture (2 hours), laboratory and field (4 hours), plus some extended field trips. Study of relationships between organisms and physical, chemical, and biological

factors of the marine environment. Consideration of the open ocean and coastal ecosystems and man's influence on them. Laboratory fee, \$45. (Spring)

**168 Tropical Marine Biology (4)** Knowlton, Packer

Study of relationships between organisms and physical, chemical, and biological factors in a tropical marine-estuarine environment, conducted through ecological fieldwork in characteristic tropical ecosystems on the island of San Salvador, Bahamas. Recommended: BiSc 122 and/or 167. Laboratory fee, \$45. (Summer, even years)

**169 Applied Marine Ecology (4)** Knowlton

Field study of interactions among biotic and abiotic components of temperate-boreal ecosystems, with emphasis on man's impact and utilization of coastal resources, conducted through surveys of ecosystems along the Maine coast. Recommended: BiSc 130 and/or 167. Laboratory fee, \$45. (Summer, odd years)

## RESEARCH AND INDEPENDENT STUDY

**171 Undergraduate Research (arr.)** Staff

Admission by permission of the staff member concerned. May be repeated for credit. Prerequisite: Chem 50 or 152; 16 credit hours in biological science courses. Laboratory fee, \$40 per credit hour. (Fall and spring)

**172 Independent Study in Cell and Molecular Biology (2)** Donaldson, Morris

Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

**173 Independent Study in Developmental Biology (2)** Brown, Burns

Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

**174 Independent Study in Organismic Biology (2)** Knowlton, Wells, Packer

Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

**175 Independent Study in Genetic and Evolutionary Biology (2)** Johnson, Lipscomb

Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

**176 Independent Study in Environmental Biology (2)** Hufford, Merchant

Prescribed reading list and consultations with staff advisor culminating in a written report and/or examination. Prerequisite: permission of instructor.

## CHEMISTRY

Professors T.P. Perros (Emeritus), W.E. Schmidt (Emeritus), D.G. White, J.B. Levy (Emeritus), N. Filipescu, E.A. Caress, D.A. Rowley, D. Ramaker (Chair), M. King, A. Montaser

Associate Professors J.H. Miller, A. Vortes

Assistant Professors R.M. Georgiadis, M.R. Johnson

Instructor J. Hilderbrandt

Bachelor of Arts or Bachelor of Science with a major in chemistry—The department offers three undergraduate majors, all designed to give students a broad background in the basic divisions of chemistry: analytical, inorganic, organic, and physical. Major I, while providing considerable concentration in chemistry, permits a wider selection of electives. It thus should meet the needs of students preparing to enter medicine, dentistry, or related fields. Major II is intended primarily for students preparing for graduate study in chemistry or those planning to enter the chemical profession and wishing to be certified by the American Chemical Society as having met the minimum requirements for professional training. Major III is a program in forensic chemistry and prepares students to meet the needs of federal and state forensic sciences laboratories.

Students planning to do graduate work in chemistry may consider taking one foreign language (Russian, Japanese, German, or French).

The following requirements must be fulfilled:

1. Students in Major I, II, and III must meet the general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses for the Bachelor of Arts degree for Major I and Major II and Bachelor of Science degree for Major III—Chem 11–12 or 17–18; Chem 22 and 23; required



courses in related fields—Math 31, Phys 21–22 and 5–6. Major I and II Bachelor of Science degree candidates must also take BiSc 11–12 or a year of other approved course work in the natural sciences or mathematics.

3. (a) Required courses for Major I—Chem 111–12, 113, 122, 134 or 235, 141, 151–52, and 153–54.

(b) Required courses for Major II—Chem 111–12, 113, 122, 123, 141–42, 151–52, 153–54, 235; one approved advanced course in chemistry or a related field. Required courses in related fields for Major II—Math 32 and a course in a structured computer programming language, such as Stat 129 or CSci 51.

(c) Required courses for Major III—Chem 111–12, 113, 122, 134 or 235, 141, 151–52, and 153–54. Required courses in related fields for Major III—BiSc 11–12; ForS 224, 225, 269, 273, and 280.

An entering student who is considering chemistry as a major is strongly encouraged to consult the Chemistry Department advisor regarding the program of study for the first two years. In general, the following sequence of courses is recommended for those students considering Major II: first year—Chem 11–12 or 17–18, Math 31 and 32 (or 30 and 31 if necessary), English composition, electives; second year—Chem 22 and 23, 151–52, and 153–54, Phys 21–22 and 5–6, Math 32 if not taken in first year, electives; third year—Chem 111–12, 113, and 141, computer programming, electives; fourth year—Chem 122, 123, 235, 142, one advanced course in chemistry or a related field, electives. Major I and Major III students should follow this sequence in general and are urged to consult with the chemistry and premedical advisors concerning their academic programs.

**Special Honors**—In addition to meeting the general requirements stated under Regulations, a candidate for graduation with Special Honors in chemistry must maintain a cumulative 3.0 grade-point average in chemistry courses and take Chem 195 for at least 3 credits over two semesters.

**Five-Year Bachelor of Science/Master of Science in the field of chemical toxicology**—A program leading to the B.S. in the field of chemistry and M.S. in the field of chemical toxicology. The first three years of the program consist of undergraduate course work. Application for admission to the M.S. program in chemical toxicology will be made during the second semester of the third year; for admission to the graduate portion of the program, acceptance must be obtained prior to the start of the fourth year of the program. If acceptance into the M.S. program in chemical toxicology is not desired or not obtained, the requirements for the B.S./B.A. in chemistry, either Major I or II, may be fulfilled by the successful completion of appropriate courses during the fourth year of study. If acceptance into the M.S. program in chemical toxicology is obtained, the B.S. in chemistry will be awarded after the successful completion of the fourth year of the program.

The following requirements must be fulfilled.

1. Students must meet the general requirements stated under Columbian College and Graduate School of Arts and Sciences. (See the Graduate Programs Bulletin also.)

2. Course requirements: Chem 11–12, 22 and 23, 111–12, 113, 122, 123, 141–42, 151–52, 153–54, 235; Phys 21–22 and 5–6; BiSc 11–12; Math 31, 32; Stat 127 and a course in a structured computer programming language: Phar 203; Bioc 221–22; Phyl 191; ForS 240, 245, and 242 or 270; either ForS or Chem 299–300; and two courses chosen from ForS 246, 248, 249, 269.

**Minor in Chemistry**—Required: Chem 11–12 or 17–18, 22 and 23, 50, and 110 or 111; Chem 151–52 and 153–54 may be substituted for Chem 50.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Upon consultation with course instructors, specific course prerequisites may be waived. Chem 11–12, 13, 17–18, and Hon 33–34 are related in their subject matter, and credit for only one of these sets of courses can be earned toward a degree.

## PHYSICAL SCIENCE

### 3–4 Contemporary Science for Nonscience Majors (3–3)

Contemporary topics in physical, biological, and medical science. Chem 3 is not prerequisite to Chem 4. Laboratory fee, \$35 per semester. (Academic year)

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## CHEMISTRY

- 11-12 General Chemistry (4-4)** Rowley, Hilderbrandt, and Staff  
Atomic structure and properties; stoichiometry; gas, liquid, and solid state; chemical bonding; solutions; chemical kinetics and equilibria; thermodynamics; acids and bases; electrochemistry; descriptive chemistry. Prerequisite to Chem 11: one year of high school algebra. Prerequisite to Chem 12, Chem 11. Laboratory fee, \$45 per semester. (Chem 11 and 12—fall and spring)
- 13 General Chemistry (4)** Miller and Staff  
For engineering students only. Stoichiometry; atomic structure and chemical bonding; gases, liquids, and solids, oxidation-reduction and acid-base reactions; thermochemistry; chemical equilibrium; electrochemistry. Prerequisite or concurrent registration: Math 31, Phys 14. Laboratory fee, \$45. (Fall and spring)
- 17-18 Advanced General Chemistry (4-4)** Rowley  
Equivalent to Chem 11-12, but with selected topics studied in depth. Additional topics may include environmental chemistry, biochemistry, and industrial chemistry. Prerequisite to Chem 17: one year each of high school chemistry (with laboratory) and algebra; a course in trigonometry. Prerequisite to Chem 18: Chem 17. Laboratory fee, \$45 per semester. (Academic year)
- 22 Introductory Quantitative Analysis (3)** Vertes  
Theory and practice of quantitative analysis by modern methods; evaluation of analytic data emphasizing detection and correction of experimental errors. Correlated with Chem 23. Prerequisite: Chem 12, 13, or 18. (Fall)
- 23 Introductory Quantitative Analysis Laboratory (2)** Vertes  
Laboratory complement to Chem 22. Prerequisite or concurrent registration: Chem 22. Laboratory fee, \$45. (Fall and spring)
- 50 Introduction to Organic Chemistry (4)** Caress, Johnson, King  
Lecture (3 hours), laboratory (3 hours). A one-semester course for students in other disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Credit may not be earned for both Chem 50 and Chem 151-52. Prerequisite: Chem 12 or 18. Laboratory fee, \$45. (Spring)
- 105 Environmental Chemistry (3)** Miller  
Chemistry and physics of the environment, with emphasis on water and air pollution; environmental analysis and modeling and their limitations. (Fall)
- 110 Introduction to Physical Chemistry (3)** Ramaker  
Gas, solid, and liquid state, chemical thermodynamics, solutions, chemical equilibrium, kinetics, quantum chemistry, spectroscopy, and macromolecules. Prerequisite: Chem 22 and 23; Math 31; Phys 2 or 22; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111-12 or an equivalent course. (Fall)
- 111-12 Physical Chemistry (3-3)** Georgiadis, Ramaker  
Gas laws, chemical thermodynamics, chemical equilibrium, kinetics, quantum chemistry, atomic and molecular spectra, structure of solids, liquids, and macromolecules. Prerequisite to Chem 111: Chem 22 and 23; Math 31; Phys 22; or permission of instructor. Prerequisite to Chem 112: Chem 111. (Academic year)
- 113 Physical Chemistry Laboratory (2)** Miller and Staff  
Laboratory complement to Chem 111. Prerequisite or concurrent registration: Chem 111. Laboratory fee, \$45. (Spring)
- 122 Instrumental Analytical Chemistry (3)** Montaser  
Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, with emphasis on atomic and molecular spectrophotometry, infrared spectroscopy, nuclear magnetic resonance, mass spectrometry, chromatography, and electroanalysis. Correlated with Chem 123. Prerequisite or concurrent registration: Chem 111 or permission of instructor. (Fall)
- 123 Instrumental Analytical Chemistry Laboratory (2)** Georgiadis  
Laboratory complement to Chem 122. Prerequisite or concurrent registration: Chem 111 and 122. Laboratory fee, \$45. (Fall)
- 134 Descriptive Inorganic Chemistry (2)** White  
Intermediate-level course emphasizing the descriptive chemistry of the elements. Prerequisite: Chem 22, 23, and 152. (Spring)



- 141 Experimental Chemistry (3)** White, Caress, King, Johnson  
Experimental methods common to all disciplines of chemistry. Use of the chemical literature; operation of chromatographic and spectroscopic instrumentation; interpretation of spectra by correlation methods. Prerequisite: Chem 154. Laboratory fee, \$45. (Fall and spring)
- 142 Advanced Experimental Chemistry (2)** White, Caress, King, Johnson  
Advanced laboratory techniques. Emphasis on individual work and on sophisticated laboratory procedures for preparation, separation, and characterization of compounds and determination of their physical properties. Prerequisite: Chem 111 and 141. Laboratory fee, \$45. (Spring)
- 151-52 Organic Chemistry (3-3)** Caress, King, Johnson  
Systematic treatment of the structure, preparation, properties, and reactions of the principal classes of organic compounds. Fundamental principles of stereochemistry, reaction mechanisms, and spectroscopic methods of analysis. Credit may not be earned for both Chem 50 and Chem 151-52. Prerequisite to Chem 151: Chem 12 or 18. Prerequisite to Chem 152: Chem 151. (Academic year)
- 153-54 Organic Chemistry Laboratory (1-1)** Staff  
Laboratory complement of Chem 151-52. Introduction to and practice in basic skills of synthesis, separation, purification, and identification of organic compounds. Prerequisite or concurrent registration: Chem 151-52. Prerequisite to Chem 154: Chem 153. Laboratory fee, \$45 per semester. (Academic year)
- 191 History of Chemistry (2 or 3)** Staff  
Historical development of chemistry from antiquity to the 20th century. Prerequisite: Chem 12. (Fall)
- 193 Chemical Instrumentation (3)** Montaser  
Electronic analog measurements and control of electrical quantities in chemical instrumentation; digital and analog data conversion and optimization of electronic measurements in chemical instrumentation; computer interfacing and programming using PC-based systems. Prerequisite: Chem 112 and 123. Laboratory fee, \$25. (Fall)
- 195 Undergraduate Research (1 or 2)** Staff  
Research on problems approved by the staff. Approval must be obtained prior to registration. A final written report on the work is required. For students requesting Special Honors in chemistry, a poster or oral presentation is also required. May be repeated once for credit. Majors are encouraged to take the course for two semesters. Laboratory fee, \$45 per credit hour. (Fall and spring)

## CHINESE

See East Asian Languages and Literatures.

## CIVIL, MECHANICAL, AND ENVIRONMENTAL ENGINEERING

Professors H. Liebowitz, J.E. Feir, T.G. Toridis, J. Eftis, R. Goulard, K. Mahmood, A.M. Kiper (Chair), M.K. Myers, R.E. Kaufman, D.M. Esterling, C.M. Gilmore, J.L. Whitesides, V. Klein, D.L. Jones, B.M. Kramer, C.A. Garriss, J.D. Lee, R.H. Tolson (Research)

Adjunct Professors W.P. Reid, M.P. Gaus, B.W. Hannah, B. Whang, D.D. Moran, M.O. Critchfield, A.G. Adamantiades, M. Yachnis, C.F. Scheffey, B. Dendrou, D.W. Coder

Professorial Lecturers N.L. Basdekas, D.R. Levin, W.D. Erickson, G.D. Love, D.J. Michel, B. Miller, E.F. Skelton, C.J. Astill, P.D. Maycock, J.C. Hardin, D.U. Gubser, J.I. Bregman, E. McCafferty, R.C. Macon, P.S. Lam, W.J. Boettinger, G.C. Everstine, J.A. Sprague, R.W. Barnwell, D.L. Dwoyer, F. Farassat, C.G. Interrante, A. Kehnemui, T. Kusuda, C.R. Hauer, D.R. Mulville, D.R. Levin, J.-N. Juang, E.B. Pritchard, J.L. Thomas, M.F. Card, M.D. Griffin, W.R. Hancuff, Jr., J.M. McMichael, I.S. Raju, M. Birkan, A. Stern, F. Markley, S. Tignor

Associate Professors M.I. Haque, R. Löhner (Research), S. Sarkani, N.E. Bedewi

Adjunct Associate Professor M.A. Imam

Associate Professorial Lecturers D.W. Ellison, R.Y.-Y. Ting, M.C. Cullingford, F.L. Willingham, Jr., A.B. Wardlow, Jr., J.C. Coolbaugh, K. Khozeimeh, R.L. Bowles, W.D. Burrows, C. Winklehaus, R.F. Jones, Jr., S.C. Mehrotra, S.M. Joshi, Jr., S.L. Zimmerman, C.C. Frantz, A. Ghamarian, J.F. O'Dea, W.B. Fichter, L.B. Garrett, P.N. Majumdar, J.N. Moss, P. Dechaumphai, C.H. Gerhold, V. Mukhopadhyay, T.K. O'Brien

Assistant Professors A.D. Cutler, C. Mavriplis, Y.-L. Shen, Y.M. Najjar, B.R. Bierck

Assistant Professorial Lecturers R. Lee, T.L. Walton, Jr., G.E. Hicho, M.P. Gottlieb, E.T. Von Briesen, J.M. Luckring, K.G. Garrahan, A.L. Dinsenhacher, R.P. Weston, S. Feng, L.C. Hartung, E.A. Morelli, M.J. Shuart, P.A. Gnoffo, P. Matic

See the School of Engineering and Applied Science for the programs of study leading to the Bachelor of Science (Civil Engineering) and Bachelor of Science (Mechanical Engineering).

## CIVIL ENGINEERING

- 117 Engineering Computations (3)** Esterling and Staff  
Application of numerical methods to the solution of engineering problems. Reduction of physical and engineering systems to computer models. Optimization techniques, physical modeling. Emphasis on use of small-scale computing systems. Prerequisite: CSci 50 and junior status. (Fall)
- 120 Introduction to the Mechanics of Solids (3)** Sarkani and Staff  
Stress and strain, axial load problems, torsion, shear force and bending moment, pure bending of beams, shearing stresses in beams, compound stresses, analysis of plane stress and plane strain, combined stresses, deflection of beams, statically indeterminate problems, columns, the energy methods. Prerequisite: ApSc 57, 113. (Fall and spring)
- 121 Structural Theory I (3)** Toridis and Staff  
Theory of statically determinate structures; stability and determinacy; influence lines and moving loads. Analysis of roof systems and cable structures. Calculation of deflections. Approximate methods of analysis of indeterminate structures. Prerequisite or concurrent registration: CE 120. (Fall)
- 122 Structural Theory II (3)** Toridis and Staff  
Theory of statically indeterminate structures using matrix methods and classical approaches such as moment distribution and slope-deflection; influence lines; energy methods. Prerequisite: CE 121. (Spring)
- 140 Materials Science (3)** Gilmore and Staff  
Metallic, covalent, and ionic bonding; crystal structure; imperfections; noncrystalline solids; reaction rates; phase transformations, mechanical properties, electrical conduction; metals, insulators, semiconductors; magnetism; optical properties. Prerequisite: Chem 13; concurrent registration: Phys 16. (Fall and spring)
- 166 Materials Engineering (2)** Gilmore and Staff  
Mechanical properties, plastic deformation dislocation theory, yielding, strengthening mechanisms, microstructure and properties, heat treatment of steel, composites, amorphous materials, viscoelastic deformation, creep, fracture, fatigue, fatigue crack propagation. Prerequisite: CE 140; concurrent registration: CE 120. (Fall and spring)
- 167 Mechanics of Materials Laboratory (1)** Gilmore and Staff  
Measurement of strains and study of failure resulting from applied forces in ductile, brittle, anisotropic, elastomeric, plastic, and composite materials. Study of tension, compression, bending, impact, and shear failures. Prerequisite or concurrent registration: CE 166. (Fall and spring)
- 168 Introduction to Geotechnical Engineering (3)** Staff  
Soils and rock formation, soil composition, permeability, seepage and flow net analysis, stresses in soil medium, consolidation and settlement, shear strength of soil, analysis of lateral earth pressures, soil compaction. Prerequisite: CE 120, ME 126. (Fall)
- 182 Foundation Engineering (2)** Staff  
Subsurface exploration, bearing capacity and settlement of shallow foundations, structural design of spread and combined footings, and analysis of pile foundations. Prerequisite: CE 168. (Spring)
- 185 Geotechnical Engineering Laboratory (1)** Staff  
Laboratory experiments to evaluate liquid and plastic limits, grain-size distribution, shear strength, compressibility, permeability, and moisture-density relationship of soils. Prerequisite: CE 168. (Spring)
- 190 Contracts and Specifications (2)** Staff  
Law of contracts, construction contracts, specifications, bidding, insurance and bonds, professional liability, arbitration of disputes, litigation. (Fall)



- 191 Metal Structures (3)** Toridis and Staff  
Principles of the design of metal structures, structural elements, connections, specific problems of analysis, methods of construction, professionalism in design. A design project, including the use of computer software and a detailed report, is required. Prerequisite or concurrent registration: CE 122. (Fall)
- 192 Reinforced Concrete Structures (3)** Toridis and Staff  
Properties of concrete and reinforcement; design of shear reinforcement; development of reinforcement; design of columns, floor slabs and building frames; ethics and professionalism in design. A design project, including the use of computer software and a detailed report, is required. Prerequisite or concurrent registration: CE 122. (Spring)
- 193 Hydraulics (3)** Mahmood and Staff  
Fluid statics: pressure forces, buoyancy, and flotation. Application of kinematic principles; flow fields, stream tubes, and flow nets. Fluid dynamics: applications to pipe flow, hydraulic models, measurement of pressure, and velocity. Open channel flow: applications to water resources engineering. Prerequisite: ME 126. (Spring)
- 194 Environmental Engineering I: Water Resources and Water Quality (3)** Lamb and Staff  
Introduction to available water resources and their uses. Methods of evaluating water quality; causes and effects of quality, including impact on human health and aquatic life. Regulatory concepts and practices. Municipal water and wastewater systems. Course requirements include four periods of laboratory work. Prerequisite or concurrent registration: CE 193. (Fall)
- 195 Hydrology (3)** Staff  
Descriptive hydrology: hydrologic cycle, precipitation, stream flow, evaporation, and transpiration. Quantitative hydrology: hydrograph analysis, hydrographs of basin outflow, storage routing. Probability concepts in hydrology: flood frequency, rainfall frequency, stochastic hydrology. Prerequisite or concurrent registration: ApSc 115, ME 126, CE 193. (Fall)
- 196 Design and Cost Analysis of Civil Engineering Structures (3)** Toridis and Staff  
Total structural systems concepts. Design of civil engineering structures such as piers, wharves, bulkheads, offshore platforms, dams, and other special structures. Principles of cost analysis for timber, steel, and reinforced concrete structures. Project and report are required. Prerequisite: senior status. (Spring)
- 197 Environmental Engineering II: Water Supply and Pollution Control (3)** Lamb and Staff  
Water sources and their development. Water distribution and wastewater collection systems, including applied hydraulics of pipelines and pumps. Physical, chemical, and biological treatment of water and wastewater. Planning to meet quality needs and regulatory requirements. Course requirements include four periods of laboratory work. Prerequisite: CE 194. (Spring)
- 198 Research (1 to 3)** Staff  
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## MECHANICAL ENGINEERING

- 117 Engineering Computations (3)** Esterling and Staff  
Numerical methods for engineering applications. Methods for solving systems of linear equations, root finding, curve fitting, and data approximation. Numerical differentiation and integration and numerical solution of differential equations. Computer applications. Prerequisite: CSci 50. (Fall)
- 120 Methods of Engineering Experimentation (2)** Jones and Staff  
Acquisition and analysis of experimental data. Laws of modeling and simulation. Report formulation and presentation. Basic principles of measuring instruments and sensors. Fundamentals of digital data acquisition and use of computer-based data systems. Strain gages, oscilloscopes, transducers, and computerized data systems. Prerequisite: ME 117. (Spring)
- 126 Fluid Mechanics I (3)** Garriss, Mavriplis, and Staff  
Fluid properties, fluid statics, integral and differential formulations of conservation of mass, momentum, and energy. Bernoulli's equation. Dimensional analysis

- and similitude. Inviscid flow. Viscous flow. Experimental and computational methods in fluid mechanics. Prerequisite: ApSc 58. (Fall)
- 131 **Thermodynamics (3)** Goulard and Staff  
Fundamental thermodynamic concepts, Zeroth law of thermodynamics, work and heat, first law of thermodynamics, properties of pure substances, first-law analysis, second law of thermodynamics, reversibility, entropy, second-law analysis of thermodynamic systems. Prerequisite: Phys 14. (Fall)
- 134 **Introduction to Vibration Analysis (3)** Garriss, Lee  
Natural frequencies, free vibration, forced vibration. Unbalance, whirling, vibration isolation. Measuring techniques and application of computers in vibration analysis. Multiple degrees of freedom. Dynamic vibration absorbers. Shock and transient vibration. Prerequisite: ApSc 58. (Spring)
- 149 **Thermal Systems Design (3)** Goulard, Kiper  
Completion of a thermal systems design project that requires integration of the engineering science background, economics, reliability, safety, ethics, professional responsibility, and social considerations. Work includes development and use of design methodology, optimization, feasibility considerations, detailed system descriptions, and presentation of results. Prerequisite: ME 187. (Fall)
- 152 **Mechanical Engineering Laboratory (2)** Garriss and Staff  
Project-oriented course. Simulates working environment of professional engineers. Projects are assigned in student's areas of interest; student is expected to design and assemble own experiments. Extensive use of instrumentation and computing facilities. Project proposal, progress reports, final report, and periodic oral presentations required. Prerequisite: ME 120. (Spring)
- 155 **Fluid Mechanics II (3)** Garriss, Goulard, and Staff  
Potential flow theory. Boundary-layer theory. Drag on immersed bodies: form drag and skin friction. Turbulence. Compressible flow: acoustic speed, Mach number, isentropic flow, nozzle flow, normal and oblique shock phenomena, Raleigh and Fanno flows. Experimental and computational methods. Prerequisite: ME 126, 131. (Fall)
- 162 **Electromechanical Control System Design (3)** Bedewi, Lee  
Application of control theory to the design of electromechanical systems. Transducers, valves, and other control components. Mathematical models of open- and closed-loop electromechanical systems. Root locus and frequency response methods; application to the synthesis of feedback systems by both manual and computer-aided techniques. Prerequisite: ApSc 114; ME 117, 134. (Fall)
- 187 **Heat Transfer (3)** Goulard, Kiper  
Steady- and unsteady-state heat conduction problems. Analytical and numerical solution methods. Convective heat transfer, boundary-layer approach, analogy between heat and momentum transfer. Thermal radiation: fundamental concepts and laws. Heat-exchanger design. Prerequisite: ME 126, 131. (Spring)
- 189 **Mechanical Engineering Design (3)** Jones and Staff  
Design of gears, belt drives, chains, brakes, clutches, couplings, flywheels, and shafts. Preparation of a design project requiring interactions between mechanical and energy systems; the project includes a preliminary design, prototype development and evaluation, and design optimization. Prerequisite: ME 187, 193; concurrent registration: ME 195 and 196. (Spring)
- 190 **Analysis and Synthesis of Mechanisms (3)** Kaufman and Staff  
Kinematics and dynamics of mechanisms. Displacements, velocities, and accelerations in linkage, cam, and gear systems by analytical, graphical, and computer methods. Synthesis of linkages to meet prescribed performance requirements. Prerequisite: ApSc 58. (Fall)
- 191 **Mechanical Design (3)** Kaufman and Staff  
Integration of knowledge of strength of materials in a design context. Stresses and deflections in engineering structures. Theories of failure. Introduction to the design of mechanical components, such as fasteners, shafts, springs. Introduction to the use of computers in mechanical engineering design. Prerequisite: CE 120, ME 117. (Spring)
- 192 **Manufacturing Processes and Systems (3)** Kramer, Shen, and Staff  
Introduction to manufacturing techniques for metals, polymers, ceramics, and composites. Relationships between properties of materials and techniques for processing them. Process selection, design, control, and integration. Computer-



integrated manufacturing, robotics and assembly automation. Prerequisite: junior status or permission of instructor. (Fall)

- 193 Engineering Systems Design (3)** Kaufman and Staff  
Creative engineering design, problem definition, and concept generation. Design of journal and roller element bearings, fasteners and permanent joints, and springs. Design project incorporating design selection, and optimization. Project presentation using graphical and computer resources. Prerequisite: ME 191. (Fall)
- 194 Energy Conversion (3)** Kiper and Staff  
Energy sources and utilization. Production of thermal energy, conversion of chemical energy, fossil fuel systems. Production of electrical energy, fundamental principles, technological options. Energy management and economic considerations. Prerequisite: EE 20. (As arranged)
- 195 Computer-Aided Design of Mechanical Systems (2)** Jones and Staff  
Presentation of the major elements in a computer-aided design system, including interactive computer graphics and methods of design optimization. The finite element method. Design of systems involving a variety of constraints. Consideration of economic, safety, and reliability factors in the design process. Prerequisite: ME 193; concurrent registration: ME 196. (Spring)
- 196 Design Project (1)** Jones and Staff  
Identification and preparation of a design project, including problem formulation, feasibility studies and preliminary design, prototype development and testing, and design optimization. Concurrent registration: ME 195. (Spring)
- 197 Robotic Systems Design and Applications (3)** Kramer, Bedewi  
Modeling and analysis of robot designs. Kinematics, statics, and dynamics of linkages. Design and selection of mechanical structures, actuators, transmissions, and sensors. Design of robotic control systems. Relevant computer hardware and software. Industrial applications and limitations of robot systems. Lab experiments. Same as EE 192. Prerequisite: ME 182. (Spring)
- 198 Research (1 to 3)** Staff  
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## ENGINEERING SCIENCE

- 1-2 Engineering Orientation (1-1)** Jones, Martin  
Review of University resources, study skills, and time management. Introduction to SEAS undergraduate degree programs. The course is project based and stresses team work. (Academic year)
- 4 Engineering Drawing and Computer Graphics (3)** Jones and Staff  
Introduction to technical drawing, including use of instruments, lettering, geometric construction, sketching, orthographic projection, section and auxiliary views, dimensioning, pictorial drawing, and intersections and developments. Introduction to computer graphics, including topics covered in manual drawing, and computer-aided drafting. (Fall and spring)

## CLASSICS

Professor J.E. Ziolkowski

Associate Professor E.A. Fisher (Chair)

Assistant Professors M.D. Ticktin, Y.M. Moses, G.S. Meltzer (Visiting)

Assistant Professorial Lecturer D.B. Beers

Bachelor of Arts with a major in classical humanities—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Clas 1-2, 3, 4; or equivalent; or Clas 11-12, 13-14; or equivalent; and Clas 71, 72. (Hmn 1 or Hon 71 may be taken in place of either Clas 71 or 72.)
3. Required courses in the major—(a) 12 credit hours selected from 100-level classics courses; (b) 18 credit hours selected from Art 101, 102, 103, 112, 155; Hist 105, 107, 108, 109, 110, 111, 209; Phil 111; PSc 105; Rel 143.

*Bachelor of Arts with a major in classical archaeology and classics*—An interdepartmental major arranged in conjunction with the Department of Art. The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. **Prerequisite courses**—Clas 1-2, 3, 4; or Clas 11-12, 13-14.

3. Required courses in the major—Art 101, 102, 112, 155; three courses selected from Hist 107, 108, 109, 110, 209; 6 credit hours in 100-level courses in Greek or Latin. (A reading knowledge of French and German is recommended.)

*Minor in classical humanities*—(a) 6 credit hours selected from Clas 1-2 or 11-12; (b) 9 credit hours selected from Clas 3, 4, 13, 14, 71, 72, 105, 107, 108, 113, 127, 170, 185, 186; (c) 6 credit hours selected from Art 101, 102, 103, 111; Hist 107, 108, 109, 110.

### COURSES IN GREEK, HEBREW, LATIN, AND YIDDISH

- 1-2 **Beginning Latin (3-3)** Ziolkowski  
Grammatical essentials of Latin, appropriate reading selections, development of English derivatives, introduction to Roman life and literature. (Academic year)
- 3 **Intermediate Latin: Prose and Poetry (3)** Staff  
Development of ability to read and understand Latin literature of moderate difficulty. Prerequisite: Clas 1-2 or equivalent. (Fall)
- 4 **Vergil's Aeneid (3)** Staff  
Significant passages of Vergil's famous epic—in Latin; reading and discussion of the entire poem in translation. Prerequisite: Clas 3 or permission of instructor. (Spring)
- 11-12 **Beginning Greek: Classical (3-3)** Fisher  
Study of the grammar, vocabulary, and structure of ancient Greek. Reading of selected ancient authors. (Alternate academic years)
- 13-14 **Intermediate Greek: Classical (3-3)** Staff  
Reading of ancient Greek prose or poetic works (e.g., selections from Homer, Plato, Euripides). Review of grammar. Prerequisite: Clas 11-12 or equivalent. (Alternate academic years)
- 21-22 **Beginning Hebrew (4-4)** Moses  
An active presentation of Hebrew as it is spoken and written today. Comprehension, speaking, reading, and writing skills are stressed. Laboratory fee, \$50 per semester. (Academic year)
- 23-24 **Intermediate Hebrew (4-4)** Ticktin  
Further development of skills in speaking, reading, writing, and comprehension of modern Hebrew. Texts range from Israeli newspaper items to selections from classical materials. Prerequisite: Clas 21-22 or equivalent. Laboratory fee, \$50 per semester. (Academic year)
- 25-26 **Yiddish for Reading and Conversation (3-3)** Ticktin  
Grammatical essentials of the language, appropriate reading selections, conversational exercises for beginners. (Alternate academic years)
- 103 **Modern Hebrew Nonfiction (3)** Moses  
Directed readings in humanities and social sciences. Development of linguistic skills necessary for independent research. May be repeated for credit. Prerequisite: Clas 24 or permission of instructor. (Fall)
- 104 **Modern Hebrew Fiction (3)** Moses  
Study of selected modern Israeli short stories and poems. Prerequisite: Clas 103 or permission of instructor. (Spring)
- 109-10 **Major Latin Authors (3-3)** Staff  
Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Clas 3, 4; or permission of instructor. (Academic year)
- 120-21 **Advanced Hebrew Literature (3-3)** Ticktin  
Selections from Hebrew literature throughout the ages: Bible, Rabbinics, medieval Hebrew literature; classical motifs in modern Israeli literature. Literary analysis (writing and discussion) in Hebrew. Prerequisite: Clas 104 or permission of instructor.



- 139-40 **Major Greek Authors (3-3)** Staff  
 Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Clas 14. (Academic year)
- 185-86 **Directed Reading (1, 2, or 3)** Staff  
 Individual advanced reading or research in Greek, Hebrew, Latin, or classics, to be arranged with a member of the faculty. May be repeated for credit. Admission by permission of instructor.

# COURSES IN ENGLISH TRANSLATION

- 63 **Greek and Latin Origins of Medical Terms (3)** Staff  
 Mastery of medical terminology by learning word elements from Greek and Latin and the principles that govern both the formation of medical words and the derivation of their meanings. (Fall)
- 71 **Greek Literature and Civilization (3)** Staff  
 Study of ancient Greek civilization with focus on public and private life as seen primarily through literature. (Fall)
- 72 **Roman Literature and Civilization (3)** Staff  
 Study of Roman civilization with focus on public and private life as seen primarily through literature. (Spring)
- 100 **Modern Hebrew Literary Classics (3)** Ticktin  
 Prose and poetry of a century of writing from the beginning of the Hebrew literary renaissance to contemporary Israeli literature, including works of Bialik, Agnon, Hazaz, Amichai, Oz, and Yehoshua. Discussions stress historical development and authors' treatments of tradition and modernity.
- 101 **Israeli Society and Culture: Literary Perspectives (3)** Ticktin  
 A study of literature reflecting such contemporary issues as the conflict between the "builders' generation" and their children; the cultural contacts of Ashkenazim and Sefardim; image of the Arab; impact of the Holocaust; Zionist ideals and current realities. (Fall)
- 102 **Contemporary Israeli Short Stories and Poetry (3)** Ticktin  
 An introduction to post-1948 writers, including A.B. Yehoshua, Amos Oz, David Shahar, Aharon Appelfeld, Dahlia Ravikovitch, Yehuda Amichai, Haim Gury, Amir Gilboa, and Amalia Kahana-Karmon. (Spring)
- 105 **Special Topics (3)** Staff  
 Topics in Greek, Hebrew, Roman, and Yiddish literature; topics announced in the Schedule of Classes. May be repeated for credit provided the topic differs.
- 107 **Greek and Roman Mythology (3)** Ziolkowski  
 The creation of the world, the nature of the gods, and the adventures of heroes as described in various Greek and Roman literary sources (e.g., epic, drama, hymns) and as shown in ancient art. (Fall)
- 108 **Approaches to Classical Mythology (3)** Staff  
 Selected classical myths examined through various disciplinary approaches, such as archaeology, psychology, history, and women's studies. Prerequisite: Clas 107. (Spring)
- 113 **Greek and Roman Drama (3)** Staff  
 Study of Greek and Roman tragedy and comedy; the nature and setting of dramatic performance in classical antiquity. (Spring)
- 127 **Classical Influence on Western Civilization (3)** Ziolkowski  
 A survey of Greek and Roman influence on Western civilization, especially in architecture, language, literature, and science. Prerequisite: a course in classical literature or history.
- 170 **Issues of Gender in Classical Antiquity (3)** Staff  
 In-depth study and discussion of readings from ancient and modern sources on women and gender difference in Greek and Roman society.

# COLUMBIAN COLLEGE ADVISING WORKSHOP

## Workshop Leaders

M. Alcorn, M. Bendas, L. Brandt, Y. Captain-Hidalgo, P.R. Churchill, P. Connerton, J.J. Cordes, W.P. Cupples, J. Folkerts, N.C. Garner, D.A. Grier, R.J. Guenther, J. Hilderbrandt, A. Hildebeitel, L. Jacobson, C.W. Linebaugh, J. Lowe, C. Meloni, B.M. Mergen, J.A. Quitslund,

P. Robbins, D. Rowley, B.W. Sabelli, O. Seavey, C. Sten, J. Stephanic, G.C. Stephens, R.W. Stephens, R. Stoker, N. Taghavi, D.H. Ullman, S. Wright, H. Yeide, L. Youens, M.C. Zea, J. Ziolkowski

The Columbian College Advising Workshop is open only to Columbian College freshmen. In addition to the workshop leader, each workshop has a team that includes a member of the University's professional or administrative staff and a student peer advisor. The advising workshop's one hour of credit does not count toward degree requirements.

#### 1 Freshman Advising Workshop (1)

McAlevey and Staff

Participatory and informational sessions required for entering freshmen, designed to integrate students into Columbian College and the University by providing an introduction to the liberal arts, promoting effective participation in a richly diverse academic community, and encouraging an enlightened self-sufficiency in the selection of courses and majors.

### COMMUNICATION STUDIES

Professors P. Robbins (Director of the Journalism Program), C.H. Sterling, J.B. Manheim (Director of the National Center for Communication Studies and of the Political Communication Program), C. Warren (Director of the Speech Communication Program), L.N. Hansen (Research)

Professorial Lecturers F.L. Dennis, L.B. Laurent

Associate Professors J.E. Thiel (Director of the Radio-Television Program), C.W. Puffenbarger, J.L. Folkerts, E.M. Mahoney

Associate Professorial Lecturers T.O. Cron, J.R. Fogarty, D.L. Smith, R.S. Becker, J.A. Echave, S.V. Roberts, C. Flintoff, L.C. Francis

Assistant Professors S. Keller, K. Riley, S.L. Livingston, L.S. Harvey, D.J. Latourette

Adjunct Assistant Professors M.M. Travis, D. Havinga

Assistant Professorial Lecturers E.B. Feldman, M.C. Sheward, C. Stoltz

Through the National Center for Communication Studies, the University offers programs leading to degrees in journalism, political communication, radio-television, and speech communication. Established in 1991, the National Center is the successor to the Departments of Communication and Journalism and the Political Communication Program, and incorporates all of the curricula previously administered by those units. Enrollment in majors offered by the National Center is restricted; please contact the Center's office for details.

At press time, the curricula of the Center were being reviewed. This issue of the Bulletin retains course numbering and requirements as they were in effect at the time of the reorganization.

### JOURNALISM

*Bachelor of Arts with a major in journalism*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Engl 51-52 or 71-72; Jour 71-72; PSc 1 and 2; Stat 51 or 53.

3. Required courses in the major—24 hours of second-group courses in journalism, including (a) Jour 111, 196, 198; (b) 9 credit hours chosen from Jour 121, 125, 133, 135, 137, 138, 139, 151, 155; and (c) 6 credit hours chosen from Jour 115, 116, 117, 128, 129, 140, 145, 146, 150, 170, 190 (only 3 credits will apply), 199.

4. Required as a secondary area of concentration—a minimum of 18 credit hours of second-group courses, chosen in consultation with the major advisor, in one other department or field of study.

Recommended electives (some of these courses may be taken to meet the general curriculum requirements of Columbian College): AmCv 71-72; Art 23; Econ 121, 142, 157, 161, 162, 181-82; Hist 71-72; Phil 45, 121; PSc 110 through 122; Psyc 115; Comm 132, 133, 134, 145; Stat 105, 129.

Enrollment into the major is restricted; contact the program office for details.

*Minor in journalism*—The student must complete 21 credit hours in journalism, including Jour 71 or 72; Jour 111; one course selected from Jour 115, 116, 117, or 170; three courses



selected from Jour 121, 125, 133, 135, 137, 138, 139, 151, or 155; and any one other journalism course.

**Special Honors**—Senior journalism majors with a grade-point average of 3.5 in at least five 100-level journalism courses may apply for special honors at the start of the senior year with submitted proof of ability in print or broadcast professional media. They then must complete degree requirements with grades of A or B in at least 50 percent of all work done at this institution, must earn a grade-point average of at least 3.5 for all 100-level journalism courses taken, and, four weeks before expected graduation, must submit to the department published or broadcast professional work completed during the senior year.

**Departmental prerequisite:** Jour 111 and permission of the department are prerequisite to Jour 115, 125, 133, 135, 137, 138, 139, 151, 155, 190, and 196.

**71-72 Introduction to Mass Communication (3-3)**

Folkerts

Jour 71: Historical study of U.S. news media: political, social, and economic developments. Media relations with government and the evolving concept of freedom of the press. Hist 71-72 recommended. Jour 72: The U.S. press, radio, television, and other mass media. Monopoly, libel, government regulation, ethics, and news media responsibility.

**111 Reporting (3)**

Robbins, Puffenbarger

Gathering information, evaluating it, and writing news and feature stories with emphasis on print media. Historical, ethical, and legal perspectives of journalistic reporting. Assignments on campus and within the metropolitan area, with concentration on government and politics. Freshmen must obtain departmental permission before enrolling. Laboratory fee, \$35.

**115 Newspaper Editing and Make-up (3)**

Puffenbarger

Modern newspaper design and the editing and page layout process. Practical work in selecting and editing stories for publication; writing headlines and photo captions; selecting, sizing, and cropping photos and other graphic materials; and laying out pages. Procedures and ethics for editors and designers. Prerequisite: Jour 111 or permission of the department.

**116 Magazine Layout and Design (3)**

Smith

Layout, typography, and design for magazines, newsletters, house organs, and similar publications for associations, institutions, and industry.

**117 Magazine Editing (3)**

Staff

The editor's responsibility to publisher and readers. Setting the editorial goals and planning content and production to meet them. Editing copy for general and specialized magazines.

**121 Feature Writing (3)**

Folkerts

Free-lancing nonfiction articles; obtaining materials through independent investigation. Permission of the instructor required.

**125 Science Writing (3)**

Staff

Writing science news for the mass media.

**128 Government Process and the Media (3)**

Staff

Examination of the roles played by the news media that affect the political process, including the impact the media have on the Presidency, the Congress, and the bureaucracy, and the adequacy of news organizations to provide information and analysis needed by citizens to exercise effective self-government. Same as PSc 128.

**129 Television and Politics (3)**

Staff

Same as Comm/PSc 129.

**133 Advanced Reporting: Public Affairs (3)**

Puffenbarger

Coverage and writing of local and state governmental news.

**135 Advanced Reporting: Consumer and Service Journalism (3)**

Cron

Specialized training in writing service stories and consumer news. (Fall)

**137 Advanced Reporting: National Affairs (3)**

Fogarty

Coverage and writing of federal government news.

**138 Investigative Reporting (3)**

Puffenbarger

In-depth reporting in selected areas of political, economic, and social affairs. Prerequisite: Jour 133 or permission of instructor.

**139 Advanced Reporting: Radio and Television News (3)**

Feldman

Preparing news and public affairs programs for broadcast media.

- 140 Photojournalism (3)** Echave  
Elements of effective news and feature photographs, including study and evaluation of slides taken by students. Picture selection, cropping, captions. Student costs include film and development of slides.
- 145 Principles and Problems of Public Relations (3)** McGill, Sheward  
Principles, problems, and ethics of public relations for government agencies, commercial establishments, educational and other public institutions. Case histories of successful programs.
- 146 Government Information (3)** Staff  
Growth of information activities in government and the role of the information specialist. Writing and editing for government information operations.
- 150 News Coverage in Washington (3)** Puffenbarger  
The Washington news beats, channels and sources of news in the nation's capital, uses and abuses of the media. Field trips to local news centers and press briefings.
- 151 Editorial Writing (3)** Robbins  
Techniques of editorial writing, conducting the editorial page, function of editorials and columns of news commentary in a free press. Permission of the instructor required.
- 155 Critical Writing and Reviewing (3)** Laurent  
Reviewing and commenting on the arts and entertainment for the mass media.
- 170 News Publication Management (3)** Staff  
The business side of publishing. Study of the roles of advertising, circulation, promotion, accounting and administration, and mechanical departments in newspapers and other publications.
- 190 Internship in Journalism (3)** Staff  
Study of a journalistic medium in action by working in a Washington area news office. Admission restricted to junior and senior journalism majors approved by a departmental committee. May be repeated for up to 9 credits.
- 196 Senior Project (3)** Staff  
Open only to journalism majors. Major journalistic effort undertaken in consultation with a member of the journalism staff. A written request describing the project must be presented to the staff member for approval and filed with the student's advisor in the semester before registration.
- 198 Law of the Press (3)** Dennis, Becker  
Freedom of the press, censorship, legislative controls, publication as contempt of court, copyright, news-gathering agencies, labor law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy.
- 199 Special Topics in Journalism (3)** Staff  
Selected topics, writing, editing, graphics, photojournalism, or other aspects of communication. May be repeated for credit.

## POLITICAL COMMUNICATION

*Bachelor of Arts with a major in political communication*—The following requirements must be fulfilled:

1. The general requirements stated under *Columbian College and Graduate School of Arts and Sciences*.
2. Prerequisite courses: one course chosen from Stat 53, 91, 105 (Stat 53 is usually preferred); PSc 1, 2; Econ 11 or 12; Comm 133; Jour 72.
3. Required courses in the major:
  - (a) PCm 100, 199; Comm 100, 130; Jour 111; PCm/PSc 103; PSc 120.
  - (b) Four courses selected from the following, at least two of which must be courses other than political communication: PCm 150, 191, 192, 195; Jour/PSc 128; Comm/Jour/PSc 129; Comm 175, 181, 184; Jour 146, 198.
  - (c) Four additional 100-level courses offered by the Department of Political Science or by other programs of the National Center for Communication Studies.

*Special Honors*—Students with a grade-point average of at least 3.5 in all course work completed at this institution and in all courses required for the major may declare for Special Honors at the beginning of the senior year. To achieve Special Honors, the student must maintain the stated grade-point requirements and present a successful oral defense of



a research paper prepared for the Senior Seminar in Political Communication before an interdisciplinary committee that includes the program director and two other faculty members nominated by the student and approved by the program director. It is recommended that students declaring for Special Honors take PCm 195 in the first semester of the senior year and PCm 199 in the second semester.

- 100 Introduction to Political Communication (3)** Livingston, Manheim  
Basic concepts and theories of political communication; development of a framework for analyzing political communication; applications in the United States, other countries, and the international system. Limited to political communication majors. (Spring)
- 103 Political Communication Research (3)** Livingston, Manheim  
Strategies and techniques of empirical research with application to the study and practice of political communication. Students may not receive credit for both PCm 103 and PSc 101. Prerequisite: PCm 100. (Fall)
- 150 Selected Topics in Political Communication (3)**  
Topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 191-92 Field Experience (3-3)**  
Open to juniors and seniors majoring in political communication. Students spend at least 16 hours a week during the semester in an approved agency or office performing practical work in the subject under the general guidance of a faculty advisor. Grades are assigned on a pass/no pass basis only.
- 195 Independent Study (1 to 6)**  
The student pursues a program of directed reading or original research under the direction of a faculty advisor. Limited to seniors or exceptionally well-prepared juniors majoring in political communication. Before registering, the student must obtain approval of a written plan of study by the faculty member who will direct the study and the program director.
- 199 Senior Seminar in Political Communication (3)** Livingston, Manheim  
Limited to majors in political communication. Selected reading and discussion with possible fieldwork in the professional subject.

## COMMUNICATION

*Bachelor of Arts with a major in radio-television*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in related areas—15 credit hours of 100-level courses in a single subject area other than radio-television or speech communication, as approved by the major advisor.
3. Required program courses—Comm 1, 100, 110, and 199.
4. Required courses in the major—Comm 75, 133, 134, and 145. Eighteen hours of 100-level radio-television or film courses, as approved by the major advisor; 9 of these hours must be in the 180-189 radio-television sequence.

*Bachelor of Arts with a major in speech communication*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in related areas—15 credit hours of 100-level courses in a single subject area other than speech communication or radio-television, as approved by the major advisor.
3. Required program courses—Comm 1, 100, 110, and 199.
4. Required courses in the major—Comm 112, 121, 126, and 143 or 144. Fifteen hours of 100-level speech communication courses as approved by the major advisor; 6 of these hours must be in the 180-189 sequence.

*Minor in speech communication*—18 credit hours of communication courses, including Comm 1, 112, 121, and 126.

**Note:** For Comm 75, 130, 132, 134, 145, and 146, attendance on the first day of class is required because production instruction is provided that will not be repeated.

- 1 Speech Communication (3)** Keller, Riley, and Staff  
The study and practice of the basic principles and techniques of public speaking used to inform and persuade audiences. Emphasis on the speech building process: research, composition, organization, style, delivery, and criticism. (Fall, spring, and summer)
- 30 Television's View of America (3)** Travis  
The role of television entertainment and news programming in portraying the American people and interpreting their values and aspirations, their faults and frailties, their successes and failures, their heroes and villains. (Summer)
- 75 Sight and Sound (3)** Thiel, Havinga  
Development of a critical awareness of aural and visual communication through an introduction to the aesthetics, techniques, and organization of the creative process in electronic media. Lecture (2½ hours), laboratory (2 hours). Prerequisite: permission of instructor for nonmajors. Laboratory fee, \$30. (Fall and spring)
- 100 Communication Theory (3)** Riley, Warren  
Study of the various theoretical approaches that may explain the role of communication in society and its impact and practice. Examination of theories of rhetoric, communication, and mass communication, along with the biases, assumptions, and research methodologies of each approach. (Fall and spring)
- 110 Research Methods in Communication (3)** Harvey, Mahoney  
Scientific method and ethics of research, examined in relation to the study of communication. (Fall and spring)
- 111 Business and Professional Speaking (3)** Staff  
Study of the communication process in business and professional organizations; practice in interviewing, small-group communication, and speeches for special occasions. For nonmajors only. (Fall, spring, and summer)
- 112 Persuasion (3)** Warren  
In-depth study of the principles and techniques of persuasion, focusing on theory. Emphasis is placed on the common-premise model while considering factors of image, support materials, emotion, audience analysis, and style. Prerequisite: Comm 1 or permission of instructor. (Fall and spring)
- 121 Small Group Communication (3)** Riley  
The study and practice of communication in small groups focusing on problem solving, norms, roles, and leadership. Prerequisite: Comm 1 or permission of instructor. (Fall and spring)
- 126 Argumentation and Debate (3)** Keller  
Study of the advocacy process, with emphasis on issue identification, use of evidence, and logical proof. Practice in oral advocacy and argumentative speaking. Prerequisite: Comm 1 or permission of instructor. (Fall and spring)
- 127 Forensic Practice (1)** Keller  
Student participation in intercollegiate speech activities. May be repeated for a total of 4 credit hours of credit. Admission by permission of instructor. (Fall and spring)
- 129 Television and Politics (3)** Staff  
Same as Jour/PSc 129.
- 130 Radio-Television Production for Non-Majors (3)** Havinga  
Basic concepts of radio and television as communications media, with emphasis on design and production techniques with applications in political communication. Priority given to political communication majors. Laboratory fee, \$30. (Fall and spring)
- 132 Radio-Television Performance (3)** Thiel  
Introduction to the basic theories and techniques required for effective, non-dramatic media performance (i.e., announcing, moderating, newscasting, etc.). Prerequisite: Comm 1 or permission of instructor. Laboratory fee, \$30. (Spring and summer)
- 133 American Electronic Media (3)** Sterling, Harvey  
Study of the origins, structure, and nature of American broadcasting and related media.
- 134 Sound Design (3)** Staff  
Introduction to basic concepts of traditional audio and sound design as creative communication medium; emphasis on design and technique for a variety of



- formats. Lecture (2½ hours), laboratory (2 hours). Prerequisite: Comm 75. Laboratory fee, \$30. (Fall and spring)
- 137 **Scriptwriting (3)** Harvey, Latourette  
Study and practice of the forms, techniques, and types of writing for radio, television, and film. Prerequisite: Engl 11 or 12, and (for radio-television majors) Comm 75.
- 142 **Topics in Electronic Media (1 to 3)** Staff  
Topic and fee announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. (Fall, spring, and summer)
- 143 **Origins of Contemporary Rhetorical Theory (3)** Warren  
Study of rhetorical theory and method as they evolved in the Western world from the classical period to the present. (Spring, even years)
- 144 **History of Rhetoric in American Public Address (3)** Keller  
Study of American oratory from its pre-Revolution origins to the present day, interpreted in terms of issues and movements. (Spring, odd years)
- 145 **Image Design (3)** Latourette  
Introduction to basic concepts of video as a creative communication medium; design and technique, planning, and directing in a studio context. Lecture (1½ hours), laboratory (3 hours). Prerequisite: Comm 134. Laboratory fee, \$40. (Fall)
- 146 **Television Directing (6)** Thiel  
Advanced study and practice of television directing techniques. Students are expected to demonstrate skill in working with studio and electronic field production equipment and in the development of television programs from original concepts to final productions. Lecture (3 hours), laboratory (4 hours). Prerequisite: Comm 145 and permission of instructor. Laboratory fee, \$40. (Spring)
- 171 **Language of Cinema (3)** Travis  
Introduction to cinema as language through analysis of the components of film structure—camera, editing, sound, movement, music, dialogue, and mise-en-scène. Laboratory fee, \$30. (Fall)
- 173 **History of Cinema (3)** Travis  
An examination of the history, structure, and theory of motion pictures in America and abroad. Same as Art 173. Laboratory fee, \$35. (Fall)
- 174 **Special Studies in Film (3)** Travis  
In-depth study of specific film topics. Prerequisite: Comm 173. Laboratory fee, \$30. (Spring)
- 175 **The Political Image (3)** Travis  
An analysis of the techniques of propaganda and rhetoric used in film and television to visualize political ideology. Laboratory fee, \$30. (Spring, even years)
- 176 **Film as Fact and Fiction (3)** Travis  
A comparison of structural differences between documentary and fiction film in order to study how each presents different versions of reality. Laboratory fee, \$30. (Spring, odd years)
- 180 **Regulation and Policy in Electronic Media (3)** Sterling  
Legal, technical, political, economic, and social aspects of radio, television, and cable and related delivery systems. Structure and operation of FCC and other agencies, plus role of Congress and courts. Consideration of problems in spectrum allocation, behavioral regulation, the trend to deregulate political influence, and current policy matters. Prerequisite: Comm 133. (Fall)
- 181 **Media Management (3)** Latourette  
Decision-making, strategic planning, and daily operations of radio, television, and cable; programming and sales strategies, promotion, and impact of ratings and research. Prerequisite: Comm 133. (Fall)
- 182 **Innovation in Electronic Media (3)** Harvey  
Examination of current and future trends in electronic media, with emphasis on radio, television, and cable, including developments in technology, programming, industry structure, and public policy. Prerequisite: Comm 133. (Fall)
- 184 **International Communication (3)** Mahoney  
Major international news-gathering and broadcasting organizations, international communications policy forums, organizations and treaties, spectrum allocation criteria, communications technology, programming development,

- and trade. International propaganda as a policy tool; "New World Information Order." Prerequisite: Comm 133. (Spring)
- 185 **Comparative Communication Systems** (3) Mahoney  
In-depth study of the developmental, regulatory, political, economic, and cultural dimensions of selected foreign communication systems; emphasis on broadcasting, cable, and satellite applications. Prerequisite: Comm 133.
- 187 **Seminar: Topics in Communication** (1 to 3) Staff  
Topic and fee announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. (Fall and spring).
- 189 **Effects of Electronic Media** (3) Harvey, Mahoney  
Current concepts of the impact of broadcasting and related media on audiences; social science research findings and methods, including persuasion, formation of opinion, media and personal interaction, violence, audience characteristics and media use patterns, and development of related theories and models of mass communication. Prerequisite: Comm 133. (Spring)
- 196 **Independent Study** (1 to 3) Staff  
Independent research and special projects. Open to seniors or exceptionally well-prepared juniors majoring in speech communication. Before students are permitted to register for Comm 196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will be directing the study and of the program director.
- 197 **Internship: Radio-Television** (3) Thiel  
Open to seniors majoring in radio-television. Students spend at least 16 hours a week during the semester in an approved media position with a local nonprofit, corporate, or commercial organization. Seminar meetings, reports, and career-oriented projects. Admission requires an application and approval of the program director. May be repeated once for credit. (Fall and spring)
- 198 **Internship: Speech Communication** (3) Warren and Staff  
Open to seniors majoring in speech communication. Students spend at least 16 hours a week during the semester in an approved communication-related position with a local organization. Meetings with advisor and an application-oriented paper are required. Admission requires approval of the program director. May be repeated once for credit. (Fall and spring)
- 199 **Senior Seminar in Communication** (3) Sterling, Thiel, and Warren  
For students completing a communication major. Integration of the concepts of communication. Under the guidance of an instructor, the student writes a major research paper on an approved topic. Prerequisite: permission of instructor and program director. (Fall)

## COMPUTER AND INFORMATION SYSTEMS

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See Statistics/Computer and Information Systems.

## COMPUTER SCIENCE

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See Electrical Engineering and Computer Science.

## COUNSELING

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See Human Services.

## CRIMINAL JUSTICE

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See Sociology.

## DANCE

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See Theatre and Dance.

## DRAMA

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See Theatre and Dance.



## DRAMATIC LITERATURE

### Committee on Dramatic Literature

A. Pao (Chair), G. Paster, R.L. Combs, N.C. Garner, W.A. Pucilowsky, C.F. Gudenius

Columbian College and Graduate School of Arts and Sciences offers an interdisciplinary program in dramatic literature leading to the degree of Bachelor of Arts. This major, which combines the strengths of the Departments of English and of Theatre and Dance, is designed to give equal consideration to the two key aspects of theatre—the literary text and the production.

*Bachelor of Arts with a major in dramatic literature*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in related areas—12 credit hours chosen from Art 31–32; Hmn 1, 2, 4, 5, 6; Mus 103–4; Phil 162; TrDa 190–91.
3. Required courses for the major (42 credit hours):
  - (a) Engl 120, 127–28; Engl/TrDa 124; TrDa 145–46.
  - (b) 12 credit hours in drama courses or related topics selected from Anth 191/TrDa 140; Clas 113; Engl 105, 108, 155, 156, 157, 158, 165, 166; Mus 121; Fren/Span 132.
  - (c) 12 credit hours in performance and production courses in the Department of Theatre and Dance, including TrDa 14, 130, 147.

## EARLY MODERN EUROPEAN STUDIES

### Committee on Early Modern European Studies

R.E. Kennedy, Jr. (Chair), I. Azar, C.A. Linden, J.A. Quitslund, L.F. Robinson, R.H. Schlagel, K. Thoenelt, D. Wallace

Columbian College and Graduate School of Arts and Sciences offers an interdisciplinary program in Early Modern European Studies. This humanities program is designed to enhance the student's understanding of the history, philosophy, religion, science, literature, and art of the five centuries (1300–1800) during which the Western world began to take on some of its modern dimensions. The program is directed by an interdepartmental committee.

*Bachelor of Arts with a major in early modern European studies*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Requirements for the major:
  - (a) Hmn 2; Phil 112; Rel 145; PSc 106.
  - (b) 6 credit hours of second-group French, German, or Spanish literature courses taught in the language, from among the following: Fren 120, 121, 122, 123; Ger 103–4, 111–12, 131–32; Span 121–22, 123–24, 125.
  - (c) 27 credit hours of art history, history, and English literature, with the course distribution to be determined in consultation with the program advisor, and with a minimum of 6 hours from each of the following groups: Art 104–5, 106–7, 108, 113–14, 121–22; Engl 125–26, 127–28, 129, 130, 131–32; Hist 105, 121, 122, 123, 141, 148, 151, 153, 154.

## EAST ASIAN LANGUAGES AND LITERATURES

Professors C.W. Shih (Chair), J. Chaves  
 Associate Professors D.L. Lee, Y.-K. Kim-Renaud  
 Associate Professorial Lecturer M.-J.C. Loh  
 Assistant Professor G.C.Y. Wang  
 Assistant Professorial Lecturer M. Frost  
 Instructor T. Kimura  
 Lecturers L.Y.C. Jiordano, N.H. Kuo

*Bachelor of Arts with a major in Chinese language and literature*—The requirements are as follows:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Chin 5-6 (preferred); or Chin 1-2, 3-4.

3. Required for the major—Chin 11-12, 107-8, 109-10, and 6 hours selected from Chin 161, 163-64; plus 12 additional credit hours of 100-level Chinese courses.

*Minor in Chinese language and literature*—Prerequisite: 18-22 credit hours, including either Chin 1-2, 3-4, and 11 or Chin 5-6 and 11. The minor consists of 12 additional credit hours selected from Chin 12, 107-8, 109-10, 123-24, 161, 163-64, and 179-80.

*Minor in Japanese language and literature*—Prerequisite: 22 credit hours, including Japn 1-2, 3-4, and 5-6. The minor consists of 12 additional credit hours: Japn 7-8 and Japn 111-12.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

## CHINESE

### 1-2 Basic Chinese (4-4)

Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, \$50 per semester. (Academic year) Wang

### 3-4 Basic Chinese (4-4)

Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee, \$50 per semester. (Academic year) Wang

### 5-6 Intensive Basic Chinese (8-8)

Intensive beginner's course in fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, \$70 per semester. (Academic year) Lee

### 10 Chinese Calligraphy (1)

Writing of Chinese characters with traditional writing implements. No knowledge of the language required. May be repeated for credit. (Fall and spring) Loh

### 11-12 Intensive Intermediate Chinese (6-6)

Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Prerequisite to Chin 11: Chin 6. Laboratory fee, \$70 per semester. (Academic year) Wang

### 22 Intermediate Chinese Conversation (3)

A practical course for improving speaking ability. Prerequisite: 6 credit hours of Chinese or equivalent. May be repeated for credit. (Fall and spring) Staff

### 107-8 Readings in Modern Chinese (3-3)

Readings in selected modern literary works, social science materials, and documentary materials. Prerequisite: Chin 12 or equivalent. (Academic year) Staff

### 109-10 Introduction to Classical Chinese (3-3)

Introduction to classical writings in Chinese literature, history, and philosophy. Prerequisite: Chin 6. (Alternate academic years) Shih, Chaves

### 123-24 Introduction to Chinese Linguistics (3-3)

Introduction to the history of the Chinese language. Analysis of linguistic structure of modern spoken Chinese and classical Chinese. Prerequisite: Chin 6 or equivalent, or a course in linguistics. (Alternate academic years) Lee

### 161 Chinese Culture Through Films (3)

Survey of the Chinese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Lectures and discussion in English. (Fall and Spring) Shih

### 163-64 Chinese Literature in Translation (3-3)

An introductory course focusing on major works of poetry, drama, and the novel in their historical and social context. (Academic year) Chaves

### 179-80 20th-Century Chinese Literature (3-3)

Works of Lu Xun, Lao She, and others. Drama of Tian Han and Cao Yu. Prerequisite: Chin 107 or equivalent. (Alternate academic years) Shih

### 185-86 Directed Reading (3-3)

Reading of material in the student's field of interest. Admission by permission of instructor. (Academic year) Staff



- 199-200 **Proseminar: Readings for the Major in Chinese Language and Literature (3-3)**  
Conferences and group discussions. (Academic year)

Staff

**JAPANESE**

- 1-2 **Basic Japanese (4-4)** Kimura, Kuo  
Fundamentals of grammar and pronunciation, with graded reading and practice in writing. Laboratory fee, \$50 per semester. (Academic year)
- 3-4 **Basic Japanese (4-4)** Kimura, Kuo  
Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee, \$50 per semester. (Academic year)
- 5-6 **Intermediate Japanese (3-3)** Kimura and Staff  
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$50 per semester. (Academic year)
- 7-8 **Intermediate Japanese (3-3)** Kimura  
Continuation of reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$50 per semester. (Academic year)
- 111-12 **Japanese Literature in Translation (3-3)** Chaves  
An introductory survey of traditional and modern Japanese literature read in English translation: love and nature poetry; theater (classical drama, puppet plays); fiction; diaries. (Academic year)
- 162 **Japanese Culture (3)** Staff  
Survey of the Japanese cultural heritage presented through films. Topics include literature, philosophy, art, religion, and social history from prehistorical times to the modern era. Lectures and discussion in English. (Spring)

**KOREAN**

- 1-2 **Basic Korean (4-4)** Kim-Renaud  
Fundamentals of grammar and pronunciation, with graded speaking, reading, and writing practice. Laboratory fee, \$50 per semester. (Academic year)
- 3-4 **Basic Korean (4-4)** Kim-Renaud  
Continuation of grammar, with emphasis on speaking, reading, and writing. Laboratory fee, \$50 per semester. (Academic year)
- 5-6 **Intermediate Korean (3-3)** Kim-Renaud  
Reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$50 per semester. (Academic year)
- 7-8 **Intermediate Korean (3-3)** Kim-Renaud  
Continuation of reading of basic texts, writing of short pieces, conversation, systematic review of grammar. Laboratory fee, \$50 per semester. (Academic year)

**EAST ASIAN STUDIES**

**Program Committee:** W.R. Johnson (Director), Y.C. Kim, C.W. Shih, G. Sigur, R. Thornton, R.Y. Yin

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in East Asian studies (with a focus on either China or Japan).

Bachelor of Arts with a major in East Asian studies—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Curriculum Requirements.
3. Required courses for the major—for the China focus: Chin 5-6, 11, and either 163 or 164; Econ 169; for the Japan focus: Japn 1-2, 3-4, either 111 or 112, and 3 additional hours in Japanese language; Econ 170; for both the China and Japan focus: one course selected from Geog 127, 132, 133, 134, 146, 266; three courses selected from Hist 137, 188, 189, 195, and either 187 or 196 (courses covering both premodern and modern periods are recom-

mended); PSc 170 or 173; three 100-level elective courses in economics, history, or political science that are not related to China or Japan and that are selected in consultation with the advisor.

4. Preparation of a substantial research paper in a two-semester research course or independent study related to the chosen focus on China or Japan. The courses taken to fulfill this requirement must be approved in advance by the program director.

The following courses pertain to East Asian studies.

Art 120	East Asian Art
Chin 163-64	Chinese Literature in Translation
Econ 169	Introduction to the Economy of the People's Republic of China
Econ 170	Introduction to the Economy of Japan
Econ 171	Newly Industrialized Countries of Asia
Hist 187	History of Modern China
Hist 188	History of Chinese Communism
Hist 189	History of Modern Japan
Hist 195	Traditional Civilizations of China and Japan
IAff 91	East Asia: Past and Present
Japn 111-12	Japanese Literature in Translation
PSc 170	Governments and Politics of Northeast Asia
PSc 173	Governments and Politics of South and Southeast Asia
PSc 175	International Relations of East Asia
Rel 158	Hinduism
Rel 160	Buddhism

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

## ECONOMICS

Professors J.W. Kendrick (Emeritus), C.T. Stewart, Jr. (Emeritus), J. Aschheim, H. Solomon, S. Levitan (Emeritus), J.L. Gastwirth, M.A. Holman, R.M. Dunn, Jr., S.E. Haber, R.S. Goldfarb, O. Havrylyshyn, A.M. Yezer, J.J. Cordes (Chair), J. Pelzman, J.E. Kwoka, R.P. Trost, B.L. Boulter, H.S. Watson, M.D. Bradley  
 Adjunct Professors J. Hardt, E.H. Solomon  
 Associate Professors R.Y. Yin, S.C. Smith, A. Klammer, R.F. Phillips, A.S. Malik  
 Adjunct Associate Professor M.A. Baily  
 Assistant Professors V. Fon, F.L. Joutz, M.O. Moore, S.M. Suranovic, H. Courtney, B. Drees, N. Vonortas, S. Joshi

*Bachelor of Arts with a major in economics*—The following requirements must be fulfilled:

1. The general requirements stated under *Columbian College and Graduate School of Arts and Sciences*.
2. Prerequisite courses—Econ 11-12.
3. Required courses in related areas—Math 41 and 42, or equivalent; Stat 111 and 112, or equivalent; 6 credit hours of a social science other than economics (Hist 39-40 or 71-72 are recommended) or Phil 51-52.
4. Required courses in the major—Econ 101, 102, 121, 198, and five additional 100-level economics courses to be approved by the departmental advisor. Grades of C- or better are required in Econ 101 and 102. A maximum of three regional courses (Econ 133, 134, 169, 170, 185) can be counted toward the five additional courses.

*Five-Year Bachelor of Arts with a major in economics and Master of Arts in the field of economics*—Students interested in the B.A./M.A. program should contact the department's M.A. program advisor early in their studies to discuss the requirements of the combined degree. Application to the graduate portion of the combined degree program will normally be made after the fifth semester of course work in the College, and students must be accepted for the graduate portion of the combined degree prior to the start of the seventh semester in the program.

*Bachelor of Arts with a major in economics*—The following requirements must be fulfilled:



1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Econ 11–12.

3. Required courses in related areas—Stat 111, 112; Math 41, 42.

4. Required courses in the major—Econ 101, 102, 121, 123, 198; three additional 100-level economics courses; Econ 203–4 and 205, microeconomic and macroeconomic theory.

*Master of Arts in the field of economics*—Required: Econ 206, 275, and six electives chosen from graduate courses in economics and successful completion of the Master's Comprehensive Examination in economic theory. See the Graduate Programs Bulletin.

*Five-Year Bachelor of Arts with a major in economics and Master of Science in the field of engineering economics*—Interested students should contact the Economics Department's undergraduate program advisor early in their studies to discuss the requirements of the combined degree program. Application to the graduate portion of the program is ordinarily made to the School of Engineering and Applied Science after the fifth semester, and students must be accepted for the graduate portion of the combined degree prior to the start of the seventh semester in the program.

*Bachelor of Arts with a major in economics*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Econ 11–12 (for students in this combined degree program, Econ 11–12 fulfill the social science requirement of the general requirements).

3. Required courses in related areas—Math 30, 41, and 42, or Math 30, 31, 32, and 33; Stat 111 and 112, Stat 129 or 197, Stat 157 or 160.

4. Required courses in the major—Econ 101, 102, 121, 123, 160, 198, and three additional 100-level economics courses.

5. Required courses in engineering economics—EMgt 150, 211, 212, 269 (see the Department of Engineering Management in this bulletin and in the Graduate Programs Bulletin.)

*Master of Science in the field of engineering economics*—Required: EMgt 261, 297, and 388, plus five electives of which three must be engineering management courses approved by the student's advisor. Students must satisfactorily complete the Master's Comprehensive Examination in engineering economics. See the School of Engineering and Applied Science in the Graduate Programs Bulletin.

*Five-Year Bachelor of Arts with a major in economics and Master of Science in the field of operations research*—Interested students should contact the Economics Department's undergraduate program advisor early in their studies to discuss the requirements of the combined degree program. Application to the graduate portion of the program is ordinarily made to the School of Engineering and Applied Science after the fifth semester, and students must be accepted for the graduate portion of the combined degree prior to the start of the seventh semester in the program.

*Bachelor of Arts with a major in economics*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Econ 11–12 (for students in this combined degree program, Econ 11–12 fulfill the social science requirement of the general requirements).

3. Required courses in related areas—Math 30, 41, and 42, or Math 30, 31, 32, and 33; Stat 111 and 112, Stat 129 or 197, Stat 157 or 160.

4. Required courses in the major—Econ 101, 102, 121, 123, 160, 198, and three additional 100-level economics courses.

5. Required courses in operations research (see the Department of Operations Research in this bulletin and in the Graduate Programs Bulletin)—OR 101, 102, 109, 216 for students pursuing a field in operations research; OR 101, 102, 135, and 236 for students pursuing a field in operations research with a concentration in management science.

*Master of Science in the field of operations research*—Required for a field in operations research: OR 291 and seven graduate electives chosen in consultation with the advisor.

Required for a field in operations research with a concentration in management science: OR 291, EMgt 282 or 283, EMgt 287 or Mgt 224 or Mgt 226, and five other courses selected in consultation with the advisor.

All students must satisfactorily complete the Master's Comprehensive Examination. See the School of Engineering and Applied Science in the Graduate Programs Bulletin.

**Special Honors**—Students may apply for graduation with Special Honors. To be eligible, a student must meet the requirements for Special Honors stated under University Regulations, must have a grade-point average of at least 3.5 in economics courses, and must submit an honors paper to the department. Upon review of the honors paper, the student may be recommended for graduation with Special Honors.

**Minor in economics**—(a) 18 credit hours in economics, including Econ 11–12, 101, 102, 121, and one other 100-level course in economics; (b) 6 credit hours of an approved statistics sequence, such as Stat 111–12; or 6 hours selected from Math 31, 32, 41–42, 51–52; or 3 hours of an approved statistics course plus 3 hours selected from Math 31, 32, 41–42, 51–52. Grades of C– or better are required in Econ 101 and 102.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** Econ 11–12 is prerequisite to all other courses offered by the Department of Economics.

### 11–12 Principles of Economics (3–3)

Bradley, Dunn, Goldfarb,  
Klamer, Trost, Yezer

Major economic principles, institutions, and problems in contemporary life. Econ 11: Microeconomics—supply and demand, the price system and how it works, competitive and monopolistic markets. Econ 12: Macroeconomics—national income concepts, unemployment and inflation, institutions of monetary control. Econ 11 is prerequisite to Econ 12. (Econ 11 and 12—fall and spring)

### 101 Intermediate Microeconomic Theory (3)

Fon, Goldfarb, Malik,  
Phillips, Haber, Vonortas

Analysis of household economic behavior, including derivation of demand functions. Analysis of firm behavior, including derivation of supply frameworks. Demand and supply interaction under various market structures and in factor markets. (Fall and spring)

### 102 Intermediate Macroeconomic Theory (3)

Bradley, Courtney, Joutz

Investigation of the determinants of national income, inflation, unemployment, and interest rates. Alternative business cycle theories, with emphasis on the role of imperfect information, uncertainty, and expectations. (Fall and spring)

### 104 History of Economic Thought (3)

Klamer

History of the major schools of economic thought, influence of changing problems on the development of economic theory. Prerequisite: Econ 101, 102.

### 105 Economic Conditions Analysis and Forecasting (3)

Staff

Theory and empirical analyses of economic trends and fluctuations; use of economic indicators and simple econometric models. (Fall)

### 121 Money and Banking (3)

Aschheim, Klamer, Joutz, Drees

The role of money, credit, interest rates, foreign exchange rates, and commercial banks and other financial institutions in the U.S. economy. (Fall and spring)

### 122 Monetary Theory and Policy (3)

E. Solomon, Drees

Analysis of classic and modern monetary theories and their application to current economic conditions. The links between theory and policy. The altered role of money over time; the new money technology. (Spring)

### 123 Introduction to Econometrics (3)

Trost, Phillips

Joint offering of the Economics and Statistics Departments. Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Prerequisite: Math 31 or 41; Stat 112. (Spring)

### 133 Economies of the Former Soviet Union and Eastern Europe (3)

Pelzman, Hardt

Analysis of current economic problems in the former Soviet Union and Eastern Europe. Topics include economic models of planned economies and comparative analysis of economic development programs of the former Soviet Union, Eastern Europe, and selected developing economies. (Fall)

### 134 Economies of the Former Soviet Union and Eastern Europe in Transition (3)

Pelzman, Hardt

Analysis of the transition from centrally planned to market economies in the former Soviet Union and in Eastern Europe. (Spring)



- 136 **Natural Resources and Environmental Economics** (3) Malik  
Analysis of market mechanisms that allocate energy and natural and environmental resources; investigation of actual and optimal resource allocation across uses and time; review of arguments for public intervention. (Spring)
- 141 **Women and Work in the United States** (3) Haber, Palmer  
Same as WStu/AmCv 260.
- 142 **Labor Economics** (3) Haber  
Analysis of labor supply and demand; measurement and theory of unemployment; occupational choice; wage differentials; labor market issues and policies. (Fall)
- 148 **Health Economics** (3) Bailly  
Economic analysis of the determinants of demand, supply, output, and distribution in the health care sector, with special emphasis on current policy issues of access, quality, and cost. (Spring)
- 151 **Economic Development** (3) Havrylyshyn, Smith  
Theories and empirical studies of the economic problems of developing countries. (Fall and spring)
- 153 **Income Distribution** (3) Staff  
An analysis of the distribution of income, with focus on issues relating to wealth and poverty. (Spring)
- 157 **Urban and Regional Economics** (3) Yezer  
Analysis of the determinants of urban growth and development; firm location; the functioning of urban land and housing markets.
- 158 **Industrial Organization** (3) Kwoka  
Analysis of market structure, conduct, and performance of firms in a market economy, with emphasis on case studies of U.S. industries. (Fall)
- 159 **Government Regulation of the Economy** (3) Kwoka  
Economic analysis of antitrust and regulation in the American economy. Prerequisite: Econ 158 or 101. (Spring)
- 160 **Introduction to Engineering Economic Analysis** (3)  
Same as EMgt 160.
- 161 **Public Finance I** (3) Cordes, Watson  
Economic analysis of government spending and social regulation programs. Topics include public goods, externalities, income transfer and social insurance programs, and benefit-cost analysis of government programs. (Fall)
- 162 **Public Finance II** (3) Cordes, Watson  
Economic analysis of taxes and government deficits. Topics include individual and corporate income taxes, payroll taxes, sales and excise taxes, property and wealth taxes, design of tax systems, and effects of taxation on labor and capital markets. (Spring)
- 165 **Economics of Human Resources** (3) Boulier  
Economic analysis of education and training, research and innovation, and their relation to economic growth. (Fall)
- 169 **Introduction to the Economy of the People's Republic of China** (3) Yin  
Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall)
- 170 **Introduction to the Economy of Japan** (3) Staff  
Analysis of the structure and growth of the Japanese economy. (Spring)
- 171 **Newly Industrialized Countries of Asia** (3) Staff  
Growth and development of the newly industrialized countries of Asia, especially Taiwan and South Korea. The course examines the relationship between policies and economic performance and draws lessons for other countries. (Spring)
- 179 **U.S. Economic History** (3) Berkowitz  
Same as Hist 179.
- 181-82 **International Economics** (3-3) Dunn, Pelzman, Moore, Suranovic  
Econ 181: International trade theory and policy. Econ 182: International macroeconomic theory and policy. (Academic year)
- 185 **Economic History and Problems of Latin America** (3) Staff  
Analysis of present structures and problems of Latin American economies. (Spring)

- 195 Special Topics (3)** Staff  
Topics vary, depending on current issues of interest and faculty availability. (Fall and spring)
- 198 Proseminar (3)** Aschheim, Boulter, Goldfarb, Watson  
Preparation and presentation of a research paper in any field of economics agreed upon by student and instructor. Review of selected topics in contemporary economics. Open only to economics majors in their senior year. (Fall and spring)
- 199 Independent Research (3)** Staff  
Under the personal direction of an instructor. Limited to economics majors with demonstrated capability. Prior approval of instructor required. (Fall and spring)

### EDUCATIONAL LEADERSHIP

Programs in educational leadership are offered at the graduate level by the School of Education and Human Development. The following courses are open to undergraduates.

- 104 Psychology for Learning and Teaching (3)** Gerhard  
Principles, theory, nature, and course of learning and teaching processes. Examination and analysis of the strategies and dynamics of teaching and learning in behavioral settings. Three-hour fieldwork sessions. (Fall and spring)
- 112 Measurement and Evaluation (3)** Staff  
Basic evaluative measurement techniques: selection, administration, and interpretation of standardized tests; test construction, evaluation procedures, statistical analysis. (Fall and spring)
- 125 Museums as Cultural and Educational Resources (3)** Staff  
Use of the museum for knowledge and enjoyment; museum objects as primary sources; classes meet in art, history, and science museums in the metropolitan area. (Spring)
- 180 Computer Literacy (3)** Lynch  
An introduction to computing systems. Word-processing, desktop publishing, graphics, database management, spreadsheets, charting, programming, and communications software are introduced through reading, demonstrations, and hands-on activities in a microcomputer classroom. No previous computer experience required. May be taken for graduate credit. (Fall, spring, and summer)

### ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Professors W.K. Kahn, R.L. Pickholtz, M.F. Eisenberg, A.C. Meltzer, W.D. Maurer, A.D. Friedman, H.J. Helgert, R.H. Lang, N. Kyriakopoulos, T.N. Lee, E. Della Torre, R.J. Harrington (Chair), L.J. Hoffman, O.N. Garcia, W. Wasylkiwskyj, N.A. Alexandridis, S.Y. Berkovich, M.B. Feldman, M.H. Loew, G.V. Borgiotti, R.L. Carroll, Jr., M.E. Zaghloul, M. Pardavi-Horvath, B.I. Edelson (Research), P.S. Bock, G. Frieder

Adjunct Professors J.M. Aein, P.J. Crepeau, G.J. Kowalski, D.C. Roberts, A. Schneider, C. Alexander, Jr., W.D. Jackson, H.-L.A. Hung, J.R. Silverman

Professorial Lecturers A.A. Wolf, W.T. Bisignani, R.K. Khatri, C.E. Dunham, L.M. Leibowitz, P.M. Kelly, M. Mohajeri, F. Dellon, J.A. Knight, J.H. Scharen-Guivel, M.H. Friedman, T.T. Nieh, G.M. Borsuk, J. Donelson III, J.W. Benoit, R.A. Herring, Jr., A.F. Manfredi, Jr., A.K. Mehrotra, C.-H.C. Wang, W.W. Wu, R.M. Finn, D.L. Nicholson, W.L. Pritchard, J.M. Schumpert, M.S. Gluck, D.R. Smith, A.T. Le

Adjunct Associate Professor O.S. Mazzoni

Associate Professors D.C. Rohlfis (Director of Laboratories), J.L. Sibert, Z. Klitov (Research), S. Rotenstreich, R.S. Heller, C.D. Martin, D. Saha, H.-A. Choi, K.B. Eom

Associate Professorial Lecturers M.C. Chen, R.D. Angelari, J.C.-C. Hsing, G.R. Lawrence, J.W. Fussell, P.A. Lamb, C.V. Stewart, A.L. Breitler, P.K. Wahi, C.A. Eldridge, J.A. Lipkin, Y.-S. Fu, C.M. Waespy, J. Epstein, L.A. Fletcher, J.S. Davies, Jr., E.B. Leiderman, E.H. Neal, J.J. Seppy, L.L. Burge, J.E. Pfaendtner, C.E. Knadler, Jr., E.A. Walker, J.F. Kuehls, T.B. Fowler

Assistant Professors A.K. Kakaes, B. Narahari, H. Senay, A. Youssef, J.K. Hahn, M. Azizoglu, B.R. Vojcic, D. Gobovic (Visiting), C.E. Korman

Assistant Professorial Lecturers T.R. Husson, K.J. Schmucker, J.B. Bronder, S.J. Koch, J.D. Kotulski, R.M. Tarakan, E.A. Walker, T. Nelson, R.M. Holland, J.W. Sargent, M.F. D'Antonio, M.C. McElvaney, Y.K. Park, E.S. Armstrong, D.D. Moerder



See the School of Engineering and Applied Science for programs of study leading to the Bachelor of Science (Electrical Engineering), Bachelor of Science (Computer Science), and Bachelor of Science (Computer Engineering).

### ELECTRICAL ENGINEERING

- 11 Linear Networks I (3)** Zaghloul and Staff  
Network concepts, elements, and parameters. Kirchhoff's laws, simple networks, energy and power, differential equations of networks and their solution. First- and second-order networks, phasors, and steady-state analysis. Use of circuit-simulation programs. Corequisite: ApSc 113, Phys 15. (Fall and spring)
- 12 Linear Networks II (3)** Zaghloul and Staff  
Singular functions; Laplace transform; network functions, poles and zeros; total response; time and frequency domains; convolution theorems; Fourier analysis, spectra; frequency response, Bode plots; two-port parameters. Use of circuit-simulation programs. Prerequisite: ApSc 114, EE 11, 20. (Fall and spring)
- 20 Engineering Electronics (3)** Korman and Staff  
Solid-state devices used in electronic engineering. Physics of their operation. Application to electronic circuits. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Design concepts through use of Spice and graphical techniques. Prerequisite: EE 11. (Fall and spring)
- 30 Introduction to Electromagnetics (3)** Lang and Staff  
Maxwell's equations, pulse propagation in one dimension, transmission line equations, reflection coefficient, capacitance and inductance calculations, Smith chart, plane waves, reflection from a dielectric of fiber and integrated optics. Prerequisite: ApSc 114, Phys 15. (Fall)
- 31 Fields and Waves I (3)** Kahn and Staff  
Review of vector calculus, orthogonal coordinates. Coulomb and Gauss laws, solid angle, scalar potential, dipoles, method of images, dielectrics, capacitance, Laplace and Poisson equations, boundary-value problems, numerical solutions with applications. Prerequisite: ApSc 113; Phys 15, 16. (Fall)
- 32 Fields and Waves II (3)** Kahn and Staff  
Currents, introduction to electrical transmission lines, impedance matching, Smith chart, Biot-Savart law, Ampere law, vector potential, magnets, magnetic circuits for power transformers, Maxwell equations, plane waves, Poynting vector with applications. Prerequisite: ApSc 114, EE 31. (Spring)
- 64 Instrumentation and Electronics Laboratory (2)** Rohlfis and Staff  
Characteristics and use of electronic instruments. Measurement of DC and AC electrical parameters; verification of network theorems. Characteristics of electronic devices: diodes, BJTs, FETs, SCRs, triacs. Design, Spice, and Micro-Cap simulation, construction, and testing of basic power supplies. Concurrent registration: EE 20. (Fall and spring)
- 66 Digital Electronics Design Laboratory (1)** Rohlfis and Staff  
Characteristics of electronic devices used in switching, sweeping, and waveforming circuits. Generation of waveforms. Digital storage devices and sequential circuits. Characteristics of different methods to produce binary logic gates. Characteristics of integrated circuits. Prerequisite: EE 64; prerequisite or concurrent registration: EE 122. (Fall and spring)
- 67 Switching Circuits Laboratory (1)** Rohlfis and Staff  
Analysis and design of combinational and sequential switching circuits. Design and test of encoders, decoders, multiplexers, and arithmetic units. Design of combinational circuits using a PLA, counters using a PLD, and random access memory systems. Prerequisite: EE 64; prerequisite or concurrent registration: CSci 140, EE 122. (Fall and spring)
- 114 Analog Signals and Systems (3)** Lee and Staff  
Applications of matrix theory and linear graphs to electrical network analysis; network equations; state-space formulation and solution, Fourier transforms and spectra in electrical systems. Network functions; analysis and synthesis of analog filters, the approximation problem; realization of filters. Prerequisite: EE 12, 20. (Fall)

- 117 Digital Signals and Systems (3)** Kyriakopoulos and Staff  
Signal representation, sampling and quantization, discrete-time signals, z-transforms and spectra, difference equations. Discrete Fourier transform, fast Fourier transfer, IIR and FIR filter design. May be taken for graduate credit. Prerequisite: EE 114. (Spring)
- 121 Engineering Electronics Design (3)** Korman and Staff  
Graphical analysis and design beyond the level covered in EE 20. Design of push-pull, direct-coupled, and class B and C amplifiers. Design of operational amplifiers; use in filters and electronic systems. Design of oscillators, active filters, modulators, and demodulators. Use of SPICE and MICRO-CAP II in design. Prerequisite: EE 20. (Fall)
- 122 Digital Electronics and Design (3)** Eisenberg and Staff  
Introduction to the design of large signal circuits used in computers and communications systems. Design of logic gates and flip-flops. Concepts in integrated circuit design. Design of counting and timing circuits using ICs. Pulse, sweep, and wave-shaping circuits. Prerequisite: EE 20; prerequisite or concurrent registration: EE 12. (Spring)
- 124 Nonlinear Electronic Devices (3)** Heller and Staff  
Electronic devices designed from nonlinear or quantum mechanical principles. Surface acoustic wave devices and filters. Varactors as converters, and parametric amplifiers. MOS capacitors and CCD devices; Klystrons. TWTs and gyrotrons. MASERS, LASERS, and FELs; negative conductance; transferred electron mechanism in GaAs; Gunn oscillators. Prerequisite: EE 32, 121. (Spring)
- 126 VLSI Design and Simulation (3)** Zaghloul and Staff  
Design of VLSI circuits. Stick diagramming, NMOS transistors, switch and gate logic, PLAs, finite-state machines, design rules, CAD system, speed and power considerations, floor planning, layout techniques. The student will design a VLSI circuit and simulate the design. May be taken for graduate credit. Prerequisite: CSci 140, 162; EE 122. (Fall)
- 127 VLSI Fabrication Techniques (3)** Zaghloul and Staff  
Choice of circuit technologies, process technologies associated with various types of components. Fabrication of VLSI, two basic MOS technologies and other available technologies, oxidation, photoengraving, chemical etching, diffusion. May be taken for graduate credit. Prerequisite: CSci 140; EE 122. (Spring)
- 128 Testing of VLSI Circuits (3)** Zaghloul and Staff  
Continuation of EE 126, principally for the testing of VLSI circuits that have been designed and fabricated. Topics include testing techniques and use of the VLSI system-testing laboratory. Design for testability techniques and design of a testable system. Students must test the circuits previously designed. May be taken for graduate credit. Prerequisite: EE 126. (Spring)
- 133 Electromagnetic Waves and Systems (3)** Kahn and Staff  
Time-harmonic Maxwell equations, complex Poynting vector, transmission lines, characteristics of common waveguides, resonant cavities. Smith chart, design of coaxial and waveguide systems, Lorentz reciprocity, simple antennas, design of linear antenna arrays. May be taken for graduate credit by students majoring in fields other than electrophysics. Prerequisite: EE 32. (Fall)
- 134 Optical Systems (3)** Kahn and Staff  
Introduction to the design of optical systems. Review of geometric optics, rays, and waves. Types of optical fibers, index and gradient index. Structure of beam waveguides. Gaussian beams. Design of lasers. Coherence and polarization, holographic systems. Fourier transforms and optical filtering. Coupled modes. Design of optical components. Prerequisite: ApSc 114; EE 32. (Spring)
- 143 Communications Engineering I (3)** Saha and Staff  
Signal analysis: Fourier transforms, power spectrum; principles of modulation, amplitude, frequency, and pulse modulation. Comparison of analog and digital transmission. Time and frequency division multiplexing. Random signals and noise. Transmission systems for cable, radio, satellite, and optical links. Prerequisite: ApSc 115, EE 12, 122; concurrent registration: EE 121. (Fall)
- 144 Communications Engineering II (3)** Kakaes and Staff  
Statistical theory of communications. Comparison of communications systems in noisy channels. Data communications, design of modems. Concept of information theory. Coding for noisy channels. ARQ and forward error control. Commu-



- communications protocols. Elements of traffic theory. May be taken for graduate credit by students in fields other than communications. Prerequisite: EE 143. (Spring)
- 146 Communications Laboratory (1)** Saha and Staff  
Experiments in support of the design of communications systems with emphasis on Fourier analysis, sampling theorem, filtering and aliasing, amplitude and frequency modulation, quantization and pulse code modulation, delta modulation, binary phase shift keying, quadrature phase shift keying. Prerequisite: EE 67; concurrent registration: EE 143. (Fall)
- 147 Data Communications Laboratory (1)** Saha and Staff  
Experiments in support of the analysis and design of communications systems with emphasis on network protocols. Time and frequency division multiplexing, flow control, automatic repeat request, interfacing, token ring, token bus, multiple access for Ethernet, routing, packet switching. Prerequisite or concurrent registration: EE 144, 146. (Spring)
- 160 Measurements and Instrumentation (3)** Rohlfis and Staff  
Measurements of current, voltage, power, resistance, capacitance, inductance, energy, phase angle, frequency, and time. Measurements of high-frequency signals. Analog-to-digital conversion techniques; control of measurement and instrumentation systems. Transducer characteristics and analog signal processing instrumentation. Prerequisite: EE 32, 121; CSci 140. (Spring)
- 163 Senior Electrical Engineering Design Project Laboratory I (3)** Meltzer and Staff  
Conception and design of a one-year project to be completed in EE 164. Performance of a market survey and economic analysis of the product. Completion of the preliminary design. Prerequisite: EE 66, 67, 121, 143, and senior status. (Fall)
- 164 Senior Electrical Engineering Design Project Laboratory II (3)** Meltzer and Staff  
Completion, construction, and demonstration of the project started in EE 163. Oral presentation, including visual aids, of the project. Formal written report on the project. Written assignments to enhance the ability to write technical reports. Prerequisite: EE 163. (Spring)
- 166 Electrical Power Laboratory I (1)** Harrington and Staff  
Experiments in support of the analysis and design of electrical power systems. Measurements of the characteristics of devices to generate electric power. Rectification and inversion processes for power systems and drives. Prerequisite or concurrent registration: EE 67, 177. (Fall)
- 167 Electrical Power Laboratory II (1)** Harrington and Staff  
Speed and torque control of AC and DC motors. Use of computers in the laboratory to perform such control. Applications of computer control to frequency and voltage control in power systems. Prerequisite: EE 166. (Spring)
- 168 Microwave and Laser Laboratory (1)** Wasyliwskyj and Staff  
Experiments in support of analysis and design of transmission lines, microwave components, microwave systems, fiber-optic systems, antennas and antenna arrays. Introduction to the characteristics of laser and optical systems. Prerequisite: EE 67, 133, 143. (Spring)
- 169 Advanced Electronics Design Laboratory (1)** Rohlfis and Staff  
Experiments in the analog operation of electronic devices. Characteristics of nonlinear operation of electronic devices. Use of electronic devices in communication equipment. Prerequisite: EE 32, 66, 67; prerequisite or concurrent registration: EE 121. (Spring)
- 171 Optics and Laser Laboratory (1)** Kahn and Staff  
Introduction to the design of optical systems. Experiments describing geometric and Fourier optical systems. Use of fiber-optical components. Experiments on polarization, holography, and optical filtering. Characteristics of lasers and optical components. Concurrent registration: EE 134. (Spring)
- 172 Control Systems Design (3)** Kyriakopoulos and Staff  
Mathematical models of linear systems; steady-state and transient analyses; root locus and frequency response methods; synthesis of linear feedback control systems. Prerequisite: ApSc 114, EE 12 or ME 134. (Fall)
- 176 Control Systems Laboratory (1)** Carroll and Staff  
Experiments in support of control theory, involving the use of the digital computer for process control in real time. Design of feedback and compensation with computer implementation. Digital simulation of linear and nonlinear systems. Prerequisite or concurrent registration: EE 67, 172 or equivalent. (Spring)

- 177 Electrical Energy Conversion (3)** Harrington and Staff  
Fundamentals of electromechanical energy conversion. Three-phase and single-phase AC rotating machines and transformers, DC machines, rotating machines as circuit elements. Prerequisite: EE 12, 31. (Fall and spring)
- 178 Electrical Power Systems (3)** Harrington and Staff  
Introduction to electrical power systems; transmission and distribution of electrical power, three-phase circuits, symmetrical components, fault analysis. Voltage, current, and power limitations. Analysis of lightning and switching surges in power systems. Protective devices—switchgear, arresters, and isolators. May be taken for graduate credit. Prerequisite: EE 177 and senior status. (Fall)
- 184 Introduction to Medical Engineering (3)** Eisenberg and Staff  
Terminology of the medical profession; physiology of the human body, from overall systems or functional approach; survey of present-day medical measurements and consideration of those areas in which engineering may be applied advantageously to medicine. May be taken for graduate credit by students in fields other than medical engineering. (Spring)
- 186 Medical Engineering Laboratory (1)** Loew and Staff  
Experiments in support of instrumentation used in medicine and biology; safety considerations. Acquisition and measurement of physiological signals, EKG, EEG, evoked potentials. Processing of signals derived from physiological measurements. Concepts in telemetry of medical signals. Prerequisite or concurrent registration: EE 32, 66, 121, 184. (Spring)
- 192 Robotic Systems (3)** Carroll and Staff  
Modeling and analysis of robot designs. Kinematics of mechanical linkages, structures, actuators, transmissions, and sensors. Design of robot control systems, computer programming, and vision systems. Use of artificial intelligence. Current industrial applications and limitations of robotic systems. Prerequisite: computer programming, ApSc 58, EE 172 or ME 182. (Spring)
- 196 Robotics Laboratory (1)** Carroll and Staff  
Experiments illustrating basic principles and programming of robots and other automated machinery. Design and writing of computer programs to use a robot's arm, vision, and data files to accomplish tasks. Prerequisite or concurrent registration: EE 192/ME 197. (Spring)
- 197 Special Topics (1 to 3)** Staff  
Topic to be announced in the *Schedule of Classes*. (Fall and spring)
- 198 Research (1 to 3)** Staff  
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## COMPUTER SCIENCE

- 10 Applications Software (3)** Heller and Staff  
Introduction to the use of microcomputer hardware and software for word processing (e.g., WordPerfect), spreadsheets (e.g., Quattro), and database management (e.g., dBase III), with emphasis on the use of microcomputers to solve typical problems in academia and business. May not be counted toward degree requirements by majors in the department. (Fall and spring)
- 30 Computer Literacy (3)** Martin and Staff  
For students whose majors are not electrical engineering or computer science. Survey of computers and languages, introduction to BASIC programming, history of computing, the effect of computers on our lives, uses for computers. May not be counted toward degree requirements by majors in the department. Prerequisite: high school algebra. (Fall and spring)
- 50 Computing for Engineers (3)** Martin and Staff  
Structured programming with high-level language using FORTRAN. Control structures. Different data types with emphasis on real and complex number computations. Arrays used with vector and matrix manipulation to solve simultaneous equations. External subroutines for mathematical and graphical applications. Prerequisite or concurrent registration: Math 31. (Fall and spring)
- 51 Introduction to Computing (3)** Martin and Staff  
Introduction to the solution of problems on a digital computer using Pascal. Structured programming concepts; peer review and proper documentation techniques; efficiency of programs; design of test data. Writing, debugging, and



- running programs in an interactive computing environment. Prerequisite or concurrent registration: Math 31 or permission of instructor. (Fall and spring)
- 54 **Programming Laboratory (1)** Martin and Staff  
Advanced programming techniques, including efficiency and complexity of programs, dynamic data structures, and recursion. Design and implementation of a large programming project, using the programmer team model. Prerequisite: CSci 51 or permission of instructor. (Fall and spring)
- 57 **Assembly Language Interfacing (1)** Meltzer and Staff  
Introduction to the architecture of a microcomputer. The instruction set of a microcomputer. Programming the microcomputer in assembly language. Methods of addressing and control. Types of instructions. I/O for a microcomputer. Prerequisite: CSci 50. (Fall and spring)
- 100 **Introduction to Programming (3)** Martin and Staff  
Intensive introductory course for students with a science, mathematics, or other quantitative background. Solution of numerical and nonnumerical problems on a digital computer using FORTRAN and Pascal. Recommended for graduate and advanced undergraduate students in other departments. Prerequisite: Math 32 or equivalent. (Fall and spring)
- 110 **Technology and Society (3)** Martin and Staff  
The social impact of the information age. Privacy, piracy, automation, reliability of socially critical systems, role of simulations in decision making and computer crime. Professional software tools such as word processing, graphics packages, databases, and spreadsheets. Professional ethics. Communication skills. Prerequisite: CSci 50 or 51. (Spring)
- 120 **Assembly Language (3)** Maurer and Staff  
Programming of microcomputers in machine and assembly language. Number systems and codes. Architectures of various microcomputers. Methods of addressing and machine control. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 51 or equivalent. (Fall and spring)
- 131 **Data Structures (3)** Feldman and Staff  
Data structures used in computer programming and algorithms. Use of tree structures, arrays, lists, stacks, files, strings, and linked structures. Sorting, searching, hashing, and merging of data. Performance of algorithms using different data structures. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 54. (Fall and spring)
- 133 **Discrete Structures (3)** Narahari and Staff  
Mathematics for computer science. Sets, functions, and sequences. Propositional and predicate calculus, formal proofs, mathematical induction. Matrices, semigroups, groups, and isomorphism. Relations, partitions, equivalence relations, trees, graphs. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 51, Math 32. (Fall and spring)
- 140 **Design of Switching Systems I (3)** Friedman and Staff  
Switching logic, combinational and sequential circuits. Number systems and codes, binary arithmetic, Boolean algebra. Minimization techniques. Combinational circuits, programmable logic, synchronous sequential circuits. May be taken for graduate credit except by majors in computer science. (Fall and spring)
- 142 **Foundations of Computing (3)** Choi and Staff  
Ordering, formal grammars, finite-state machines, equivalence of machines, reduction, finite-state languages, acceptors, regular expressions, pushdown automata, context-free languages, Turing machines, computability. Prerequisite: CSci 133; concurrent registration: CSci 144. (Spring)
- 144 **Programming Language Concepts (3)** Heller and Staff  
Concepts and comparisons of data types, syntax, semantics, recursion, binding times, sequence and data control, run-time resources, translators, and storage of program languages. Team programming. May be taken for graduate credit except by students in computer science. Prerequisite: CSci 120 or 157, 131. (Fall and spring)
- 145 **Software Laboratory I (1)** Rotenstreich and Staff  
Computer-programming projects designed to supplement the theory and programs of CSci 144 and 148. Students write structured programs and use proper documentation. Prerequisite or concurrent registration: CSci 144, 148. (Fall)

- 146 Software Laboratory II (1)** Rotenstreich and Staff  
Computer-programming projects designed to supplement the theory and programs of CSci 156. Team projects to design new I/O drives and similar projects involving operating system modules. Structured programming and proper documentation techniques. Prerequisite or concurrent registration: CSci 156. (Spring)
- 148 Theory of Computer Translators (3)** Feldman and Staff  
Lexical and syntax analysis, regular expressions, context-free grammars, parsing techniques, top-down parsing, efficient parsing, syntax-directed translation, intermediate formats, flow of control, block structures, procedure calls, symbol tables, run-time storage, error-detection and recovery, code optimization, code generation. Prerequisite: CSci 142, 144. (Fall)
- 155 Introduction to Numerical Methods (3)** Youssef and Staff  
Numerical methods for solving simultaneous linear equations, roots of equations, eigenvalues and eigenvectors, numerical differentiation and integration, interpolation, solution of ordinary and partial differential equations, and curve fitting. May be taken for graduate credit. Prerequisite: ApSc 113, 115; CSci 51 or equivalent. (Fall)
- 156 Introduction to Operating Systems (3)** Rotenstreich and Staff  
Process management, process state, concurrent processing, synchronization, events. Operating system structure, the kernel approach, processor scheduling, task switching, monitors. System management, memory management, process loading, communication with peripherals. File systems. Interactive computation. Prerequisite: CSci 144. (Fall and spring)
- 157 Advanced Assembly Language (3)** Maurer and Staff  
Introduction to the instructions and directives of the 8086 family. Macros and conditional assembly. I/O operations in assembly language. Segmenting large programs. Use of an operating system. Includes a term project. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 120 or equivalent. (Fall)
- 162 Design of Switching Systems II (3)** Zaghloul and Staff  
Analysis of symmetric, unate, and threshold functions: Boolean difference and decomposition. Timing in sequential circuits, essential hazards, races in sequential circuits. Design for testability. Designing using PLDs. Introduction to ASIC design techniques. May be taken for graduate credit by students in fields other than computer science. Prerequisite: CSci 140 and EE 122. (Spring)
- 163 Senior Computer Science Design Project Laboratory I (3)** Della Torre and Staff  
Conception and design of a one-year project in hardware and/or software to be completed in CSci 164. Performance of a market survey and economic analysis of the product. Completion of the preliminary design. Prerequisite: CSci 144, 172; and senior status. (Fall)
- 164 Senior Computer Science Design Project Laboratory II (3)** Della Torre and Staff  
Completion, construction, and demonstration of the project started in CSci 163. Oral presentation of the project, including visual aids. Formal written report on the project. Written assignments to enhance ability to write technical reports. Prerequisite: CSci 163. (Spring)
- 165 Sequential Circuit Laboratory (1)** Zaghloul and Staff  
Threshold circuits and asynchronous sequential circuits. Testing for faults in logic networks. Circuits using program logic devices. Use of design automation programs in designing sequential machines. Prerequisite or concurrent registration: CSci 140, 162; EE 66, 67, and 122. (Spring)
- 166 Computer Engineering Laboratory I (1)** Meltzer and Staff  
Experiments in support of the theory and design of microprocessor and micro-computer hardware and software. Use of microprocessors in control of systems. Use of simulators, cross-compilers, and development systems. Prerequisite or concurrent registration: EE 67; CSci 172. (Spring)
- 167 Computer Engineering Laboratory II (1)** Meltzer and Staff  
Class project, using a team approach in designing the subsystems needed to produce a complete digital computer system. Includes experience in software development, techniques for buses and local area networks, and design of I/O and memory subsystems. Prerequisite or concurrent registration: CSci 166, 188. (Spring)



- 168 Simulation Methods (3)** Bock and Staff  
Computational methods for continuous and discrete system simulation. Effects of computer software and hardware architectures on computational precision and accuracy requirements. Random-number generation and testing. Calibration and scaling technique. Verification and validation technique. Prerequisite: CSci 144, 155. (Spring)
- 172 Design of Computers (3)** Alexandridis and Staff  
Information and control flow, instruction sequencing. Processor structure, operation, arithmetic. Buses and systems configurations. Memory subsystem. Programmed I/O, interrupts, and DMA structures. Small computer architectures. May be taken for graduate credit except by majors in computer science. Prerequisite: CSci 120, 140. (Fall and spring)
- 174 Artificial Intelligence (3)** Garcia and Staff  
Abstraction of process and data with list structures. Functional programming. Changes in the state of objects and processes. Environments. Streams. Messages. LISP and PROLOG interpreter models using EVAL and APPLY. Symbolic logic and formal inference; unification and resolution. May be taken for graduate credit. Prerequisite: CSci 144. (Fall and spring)
- 175 Software Engineering (3)** Rotenstreich and Staff  
Macroassemblers, library management, linkers and loaders. Control of I/O via access methods. Requirements definition, modularity, structured design, data specifications, functional specifications, verification, documentation, software maintenance. Program design methods. Software tools. Software project organization, design teams, quality assurance. Prerequisite: CSci 156. (Fall)
- 178 Database Management (3)** Rotenstreich and Staff  
Design and architecture of database systems. Query formulation, data models, data structures to minimize access time, relational data structures. Construction of a database management system. Survey of existing systems. Prerequisite: CSci 144. (Spring)
- 182 Digital Computer Architecture (3)** Meltzer and Staff  
Methods of describing computer systems. Speed-up techniques in arithmetic units. High-speed central processors. Stack architecture. The storage hierarchy, virtual memory systems, and cache systems. Control units and microprogramming design. May be taken for graduate credit. Prerequisite: CSci 144, 172. (Fall and spring)
- 185 Computer Graphics I (3)** Sibert and Staff  
Hardware; concepts of graphics subroutine packages; programming concepts for interaction, display, and data structuring; basic clipping and scan-conversion algorithms; homogeneous coordinates; three-dimensional viewing transforms. May be taken for graduate credit. Prerequisite: CSci 144; concurrent registration: CSci 182. (Spring)
- 188 Distributed Computing Systems (3)** Meltzer and Staff  
Connection of microprocessors and minicomputers into a distributed computing system. Use of shared memory and distributed databases. Synchronization problems and concurrency in distributed systems. Shared bus structure, loop and token passing. Geographically distributed systems. Computer networks. Local area networks. Prerequisite: CSci 156, 182. (Spring)
- 197 Special Topics (1 to 3)** Staff  
Topic to be announced in the Schedule of Classes. (Fall and spring)
- 198 Research (1 to 3)** Staff  
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

## ENGINEERING MANAGEMENT

Programs in engineering management are offered at the graduate level by the School of Engineering and Applied Science. The courses listed here are open to undergraduates.

- 150 Introduction to Engineering Management (3)** Xue and Staff  
Interrelationships of engineering, science, and management; interaction among individuals and groups in the engineering environment. Typical activities of engineering managers, motivations of engineers, engineers as managers. (Fall, spring, and summer)

- 160 **Introduction to Engineering Economic Analysis** (3) Steiner and Staff  
Economic decisions, equivalence, mathematics of finance, present worth, annual worth, benefit-cost ratio, internal rate of return, multiple alternatives, tax effects, inflation, risk loans, retirement and replacement, sensitivity analysis.  
(Fall, spring, and summer)
- 170 **Basic Quantitative Methods for Engineering Management** (3) Papantonopoulos and Staff  
Quantitative methods appropriate to engineering management, using advanced concepts from probability and statistics. Random variables and probability distributions, estimation, test of hypotheses, linear regression and correlation, introduction to the design of experiments, analysis of variance. Prerequisite: Math 51, 52, or equivalent. (Fall, spring, and summer)

## ENGINEERING SCIENCE

See Civil, Mechanical, and Environmental Engineering.

## ENGLISH

Professors R.N. Ganz, Jr., J.H. Maddox, G. Paster, J.A.A. Plotz (Chair), J.A. Quitslund, C.W. Sten, D. McAleavey, C. Tate, O.A. Seavey, L.B. Salamon  
Associate Professors G.R. Bozzini, R.L. Combs, G. Carter, A. Romines, K. Moreland, D. Moshenberg, M. Alcorn, M.S. Soltan, J. Shore, F. Moskowitz  
Adjunct Associate Professor E.R. Garner  
Assistant Professors M.V. Dow, C. Sponsler, T.G. Wallace, M.D. Clair, S.P. Willens, P. Cook, J.M. Green, A. Nissen, A.C. Pao, P. Chu, W. Napier (Visiting)  
Adjunct Assistant Professors J. Bolz, E. Schreiber, D. Scarboro, C. Gamber, C. McMullen  
Instructors S. Callaway, D.M. Carter, N.W. Whichard, P. McGann, Y. Park, R.M. Smith, L. Taetzsch  
Adjunct Instructors D.A. Bruno, S. Gold  
Jenny McKean Moore Writer in Washington C. Maso

*Bachelor of Arts with a major in English*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Engl 51–52 or 61–62 or 71–72; or Hmn 1, 2.
3. Required courses in related areas—(a) 12 credit hours or equivalent of Greek, Latin, Hebrew, French, German, Italian, Russian, or Spanish language study at the college level; (b) 6 credit hours of philosophy, religion, and/or mythology; (c) 6 credit hours of history (English, American, European, or world).
4. Required for the major—Engl 120 and 27 credit hours of 100-level courses (of which no more than 6 hours may be taken in creative writing or composition), including at least one course from each of the following categories:
  1. Major authors (Engl 112, 127, 128, 130, 171).
  2. British and American literature before 1800 (Engl 112, 113, 125, 130, 131, 132, 153, 155, 160).
  3. 19th-century British and American literature (Engl 133, 134, 135, 136, 154, 161, 162, 163, 167).
  4. 20th-century British and American literature (Engl 137, 138, 139, 140, 157, 158, 164, 165, 166, 168, 177, 178).

With departmental approval, courses with appropriate subject matter may be taken in place of those specified above. Students take 15 additional hours of 100-level courses, of which 6 may be in the literature of a foreign language either in the original language or in translation.

Students wishing to concentrate their course work on the study of American literature should take Engl 160 and two courses on the 19th century (either 161 and 162 or 163 and 167); at least one 100-level course in English literature; and 15 additional hours of 100-level courses in the department, of which at least 9 should be in American literature.

**Special Honors**—Majors who wish to be considered for Special Honors must meet the general honors requirements listed under Regulations; have maintained a 3.0 grade-point average; and apply for admission to the program, in writing, by October 15 of the junior year. Once admitted, the candidate must enroll in Engl 195 in the spring semester and in Engl 196 in the following fall semester. During the junior year, candidates must continue to



maintain a 3.0 overall grade-point average and a 3.25 average in courses in the English Department. Subject to departmental approval, the candidate enrolls in Engl 198 in the spring semester of the senior year. To be eligible for graduation with Special Honors, candidates must earn an A on the Honors Thesis and have achieved a 3.4 grade-point average in courses in the English Department.

**Bachelor of Arts with a major in dramatic literature**—The Department of Theatre and Dance and the Department of English offer an interdisciplinary major in dramatic literature. This major, which combines the strengths of the two departments, is designed to give equal consideration to the two key aspects of theatre: the literary text and the production. See Dramatic Literature.

**Minor in English**—6 hours of introductory literature courses and 15 hours of 100-level literature courses, chosen in consultation with an advisor in the department.

**Minor in creative writing**—Engl 81, 6 hours of introductory literature (e.g., Engl 51–52), and 12 hours of 100-level courses offered by the department, of which at least 9 must be in creative writing.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** Engl 9 or 10 is prerequisite to all other courses in English. A 6-credit-hour literature survey, such as Engl 51–52, 61–62, 71–72, or any pair of courses listed under the general curriculum requirement in literature, is prerequisite for admission to all creative writing courses and 100-level courses in English except Engl 102, 110, 115, 160, 161, and 162.

Scores on the College Board English Composition Achievement Test, the Test of Standard Written English, or the English component of the American College Testing battery determine placement in Engl 9 or 10 and eligibility to waive the requirement, according to the following schedule:

Achievement Test		TSWE		ACT	Placement
650 and above	or	58 and above	or	28 and above	Waives Engl 10
500–649	or	40–57	or	20–27	Engl 10
499 and below	or	39 and below	or	19 and below	Engl 9

The admission of international students to any English course is determined by the EFL Placement Test. Students should apply to the office of English as a Foreign Language to take this test (see Students from Foreign Institutions, under Admissions).

## EXPOSITORY WRITING

- 9 **English Composition: Language as Communication** (3) Moshenberg and Staff  
Includes content of Engl 10; offers the advantage of more intensive work on analytical reading and on fluency and control in the writing process. Class meets five hours per week. (Fall and spring)
- 10 **English Composition: Language as Communication** (3) Moshenberg and Staff  
Critical examination of what language can do and what student writers can do with language; analysis of various kinds of discourse, focusing on their pragmatic and psychological dimensions. Emphasis on the writing process, with guidance in revising toward clear, effective, and engaging prose. (Fall and spring)
- 11 **English Composition: Language and the Arts and Sciences** (3) Moshenberg and Staff  
Prepares the student to participate critically in the diverse, interpretative community of the university. Analysis of texts, with emphasis on logic, values, and context. Focuses primarily on the polemic nature of writing and thought. Texts and course topics vary among sections. Prerequisite: Engl 9 or 10. Students who receive credit for Engl 11 cannot receive credit for Engl 13. (Fall and spring)
- 13 **English Composition: Language and Ideas** (3) Staff  
Study and practice of expository and argumentative techniques; emphasis on the rhetorical problems raised by various intellectual disciplines and historical

milieus. A substantial research paper is required. Prerequisite: Engl 9 or 10. To be taken only in conjunction with Hmn 1. Students who receive credit for Engl 13 cannot receive credit for Engl 11. (Fall and spring)

- 100 Intermediate Expository Writing (3)** Staff  
Concentration on perfecting the skills of addressing a variety of audiences, focusing and organizing the essay, varying tone and method of discourse, and using appropriate vocabulary in several subjects. Texts and topics vary. Prerequisite: Engl 9 or 10 and 11, or equivalent. Class size limited to 15 students.
- 101 Advanced Writing (3)** McClay and Staff  
Individualized instruction and frequent conferences; writing projects vary with each student according to needs and interests. Emphasis on developing professional work habits. Prerequisite: Engl 11 or 13, or written permission of instructor. Class size limited to 15 students. (Fall and spring)
- 102 Written Communications in Accounting (3)** Bozzini and Staff  
Analysis of communications by accountants and managers; frequent writing assignments, with emphasis on effective form and language in memoranda, letters, reports. Major in accountancy not required. Prerequisite: Engl 11 and junior status. Class size limited to 15 students. (Fall and spring)
- 110 Writing in Engineering and the Sciences (3)** Staff  
Study of writings by engineers and scientists who have considered the implications of technology in the modern world. Concurrently, study and practice of the communication skills needed for careers in engineering and the sciences. Prerequisite: Engl 9 or 10 or EFL 50; junior, senior, or graduate status. (Spring)
- 111 Preparation for Peer Tutors in Writing (3)** Callaway  
For undergraduates accepted as tutors in the Writing Center: study and practice of techniques for prewriting, writing, and revision; readings on collaborative learning, the composing process, composition theory, cognitive psychology, critical thinking, and the teaching of writing; observation and exercises in writing, peer review, and tutoring. (Fall)

## CREATIVE WRITING

- 81 Introduction to Creative Writing (3)** Moskowitz and Staff  
An exploration of genres of creative writing (fiction, poetry, and or playwriting). Basic problems and techniques; examples of modern approaches; weekly writing assignments; workshop and or conference discussion of student writing. Prerequisite: Completion of English composition requirement. Limited to 18 students. (Fall and spring)
- 103 Intermediate Fiction I (3)** Moskowitz and Staff  
The writing of fiction. Prerequisite: Engl 81 or equivalent. Limited to 15 students. (Fall and spring)
- 104 Intermediate Poetry I (3)** McAleavey, Clair, Bolz, Shore  
The writing of poetry. Prerequisite: Engl 81 or equivalent. Limited to 15 students. (Fall)
- 105 Fundamentals of Playwriting (3)** P. Griffith  
Same as TrDa 105. Study of the process of playwriting, emphasizing dramatic structure, characterization, and dialogue. Requirements include study and analysis of plays, attendance at plays, scene writing, and beginning the process of developing a play. Prerequisite: Engl 81 or equivalent and a two-semester literature survey (e.g., Engl 51-52). Limited to 15 students. (Fall)
- 106 Intermediate Fiction II (3)** Moskowitz  
The writing of fiction. Prerequisite: Engl 103 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. (Spring)
- 107 Intermediate Poetry II (3)** McAleavey, Bolz, Clair, Shore  
The writing of poetry. Prerequisite: Engl 104 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. (Spring)
- 108 Intermediate Playwriting (3)** P. Griffith  
Same as TrDa 108. Each student will develop a complete play. Attendance at local productions. Group readings of work written for the course and staging of scenes in cooperation with the Department of Theatre and Dance. Prerequisite: Engl 105 or equivalent. Limited to 15 students. May be repeated for credit with departmental approval. (Spring)



**181 Creative Writing Workshop (3)**

Taught by the Jenny McKean Moore Writer in Washington; open to undergraduates and graduate students. Prerequisite: a 100-level creative writing course. May be repeated for credit, if taught by a different instructor. Limited to 18 students. (Fall and spring)

**ENGLISH AND AMERICAN LITERATURE****51-52 Introduction to English Literature (3-3)**

Paster, Plotz, Cook, and Staff

Representative works by major authors studied in their historical context; discussion of recurrent themes and introduction to various types and forms of imaginative literature. Engl 51: Middle Ages through the 18th century. Engl 52: 19th and 20th centuries. (Academic year)

**51 Tragedy (3)**

Carter

Modes of tragedy as developed in drama, nondramatic verse, and prose fiction in literature from ancient to modern times—Book of Job to Beckett.

**62 Comedy (3)**

Carter

Modes of comedy as developed in drama, nondramatic verse, and prose fiction—Chaucer to Borges.

**71-72 Introduction to American Literature (3-3)**

Ganz, Combs, and Staff

Historical survey. Engl 71: From early American writing through Melville, Whitman, and Dickinson. Engl 72: From Twain, James, and Crane to the present. (Academic year)

**112 Chaucer (3)**

Sponsler

Chaucer's major works seen as exciting, lively texts from the modern perspective and as products of specific economic, social, and cultural trends of the late 14th century. Focus on *The Canterbury Tales*, read in the original Middle English. (Fall)

**113 Medieval Literature (3)**

Sponsler

Readings from a wide range of medieval genres, including romances, saints' legends, mystical narratives, lyrics, civic drama, and social satires, to explore some of the principal concerns of medieval culture. How these texts responded to and shaped the changing patterns of medieval culture, as the clergy, the aristocracy, and the urban bourgeoisie attempted to define a culture of their own.

**115 History of the English Language (3)**

Sponsler

A sociolinguistic approach to the history of the English language. The development of the language from Proto-Indo-European through Anglo-Saxon and Middle English: how the various dialects of modern English were shaped and how a normative "standard" English was established. Emphasis on the social contexts and cultural implications of these changes.

**120 Critical Methods (3)**

Paster, Alcorn, Romines, Sponsler, Quitslund

The topics and techniques of literary analysis, applied to English and American poetry, prose fiction, and drama. Attention to prosody, stylistic and structural analysis, narratology, and critical theory applied to specific literary texts. (Fall and spring)

**124 Play Analysis (3)**

Pao

Same as TrDa 124. Examines both traditional and nontraditional (Aristotelian and non-Aristotelian) approaches to the analysis of dramatic literature and explores literary and theatrical techniques used by playwrights.

**125 The English Renaissance (3)**

Quitslund

Verse and prose, chiefly from the period 1575-1625, seen in relation to continental culture and the social institutions that shaped the development of English culture. Sidney, Spenser, Shakespeare, Campion, Donne, Jonson, Bacon, Herbert, others; emphasis on the development of several literary styles and on adaptation of genres to suit changes in private and social experience.

**127-28 Shakespeare (3-3)**

Paster, Cook

Close study of seven or eight plays each semester, with emphasis on the texts in history and ideology. Survey of current critical practices (feminist, materialist, psychoanalytic) and deconstruction of Shakespeare as a cultural institution. (Academic year)

**130 Milton (3)**

Cook

Study of the major works in verse and prose, following the course of Milton's career. (Spring)

- 131-32 **The 18th Century: Literature and Authority** (3-3) Wallace  
Readings in significant 18th-century English writers—Dryden, Swift, Pope, Johnson, and others—with emphasis on tracing the ways in which literary texts contain, perpetuate, and subvert social and political ideologies.
- 133-34 **The Romantic Movement** (3-3) Plotz, Combs  
Major figures and topics in English and Continental romanticism. Engl 133: Blake, Wordsworth, Coleridge, Lamb, and others. Engl 134: Byron, Shelley, Keats, Hazlitt, DeQuincey, and others.
- 135-36 **Victorian Literature** (3-3) Carter  
Engl 135: 1830-1865—E. Brontë, Dickens; Tennyson, Browning, Arnold; Darwin, Carlyle, Ruskin. Engl 136: 1865-1900—Eliot, Hardy, Conrad; Swinburne, the Rossettis, Morris; Pater, Wilde, the Nineties.
- 137-38 **Modernism and Anti-Modernism** (3-3) Maddox, Soltan, Green  
Engl 137: the emergence of modernist experimentation (and the sense of epistemological and moral crisis it expressed) in the poetry and prose of Pound, T.S. Eliot, Woolf, Kafka, and others. Engl 138: the reaction against modernist styles and themes in the wake of World War II, as seen in the work of Orwell, Amis, Lessing, Tournier, Larkin, and others.
- 139-40 **20th-Century Irish Literature** (3-3) Maddox  
Irish writers from the time of the Literary Revival in the late 19th century to the present. Engl 139: Yeats and other Irish poets and playwrights of his time and after—Synge, O'Casey, Kavanagh, Heaney, and others. Engl 140: Joyce through *Ulysses* and other fiction writers of later generations—O'Brien, Beckett, and others. (Academic year)
- 153-54 **The English Novel** (3-3) Maddox, Soltan, Wallace  
Engl 153: The 18th century—Defoe, Richardson, Fielding, Sterne, and others. Engl 154: The 19th century—Austen, the Brontës, Dickens, George Eliot, Hardy, and others. (Academic year)
- 155-56 **The English Drama** (3-3) Paster  
Engl 155: Shakespeare's contemporaries. Engl 156: Historical survey, 1660 to present.
- 157 **Modern Drama** (3) Paster, Pao  
Representative continental, English, and American plays of the period 1900-1960.
- 158 **Contemporary Drama** (3) Pao  
Examines drama written since 1960 in the light of postmodernism as both a literary and a theatrical theory. Explores the ways contemporary playwrights and directors challenge the perceptions and assumptions of today's audience.
- 160 **Early American Literature and Culture** (3) Seavey  
The shaping of America's early literary and cultural traditions as shown by significant writers of the Colonial and Early National periods: Bradstreet, Cotton Mather, Edwards, Franklin, Crèvecoeur, and others. (Fall)
- 161 **American Romanticism** (3) Sten  
The shaping of America's literary and cultural traditions as shown by significant writers of the Romantic period: Poe, Emerson, Hawthorne, Melville, Thoreau, Whitman, Dickinson, and others. (Spring)
- 162 **American Realism** (3) Romines  
The shaping of America's literary and cultural traditions as shown by significant writers of the Realist period: Twain, James, Crane, Howells, Wharton, Chopin, Robinson, and others. (Fall)
- 163-64 **American Poetry** (3-3) Ganz, Combs, McAleavy  
Close examination of major American poems. Engl 163: From the beginnings through the early 20th century: works by Bradstreet, Taylor, Poe, Emerson, Whitman, Dickinson, Robinson, Frost, and others. Engl 164: The 20th-century modernist poets: Stevens, Pound, Williams, Eliot, Ransom, Cummings, Crane, and others.
- 165-66 **American Drama** (3-3) Combs  
Engl 165: The works of Eugene O'Neill and the dramatic techniques of Ibsen, Chekhov, and Strindberg that helped to shape 20th-century American drama. Engl 166: The American theater, 1935-1982, including plays by Odets, Hellman, Saroyan, Wilder, Miller, Inge, Williams, O'Neill, McCullers, and Hansberry, and outstanding examples of musical comedy.



- 167-68 **The American Novel (3-3)** Maddox, Seavey, Moreland, Sten  
Historical and critical study of major works in the American novelistic tradition. Engl 167: From beginnings through the 19th century: Hawthorne, Melville, James, Twain, Dreiser, and others. Engl 168: The 20th century: Wharton, Cather, Anderson, Hemingway, Fitzgerald, Faulkner, Wright, R.P. Warren, Nabokov, and others. (Academic year)
- 169 **Ethnicity and Place in American Literature (3)** Chu, Romines, Tate  
The relationships among ethnic identity, authorship, regional setting, and national consciousness. Differences in the literary culture of ethnically, racially, and regionally diverse American populations; how considerations of ethnicity and place have been reshaping the American literary canon. Texts and emphases vary with instructor.
- 170 **The Short Story (3)** Combs  
An extensive survey of short fiction by a wide variety of writers of the 19th and 20th centuries, about half of them American; readings on the art of the short story by writers and literary critics included.
- 171 **Major Authors (3)** Staff  
In-depth studies of a single figure or two or three authors (of British, American, or other nationality) who have written in English. Topics announced in the *Schedule of Classes*; may be repeated for credit provided the topic differs.
- 172 **Selected Topics in Literature (3)** Staff  
Topics announced in the *Schedule of Classes*; may be repeated for credit provided the topic differs. Topics of projected courses include Jewish-American fiction; children's literature; southern literature; science fiction; literature and politics; literature and philosophy; Freud, Dostoevsky, and Shakespeare; literature of the Holocaust.
- 173 **Selected Topics in Post-Colonial Literature (3)** Dow, Plotz  
Historical, critical, and theoretical study of post-colonial literatures—African, Asian, Commonwealth—in English. Topics vary with instructor. May be repeated for credit provided the topic differs.
- 174 **African-American Literature (3)** Tate, Napier  
Study of texts representing the experiences of black Americans and the ideas and social forces that have shaped their lives and writings.
- 175 **Gender and Literature (3)** Romines, Tate  
Symbolic representations of culturally defined roles and assumptions in literature. Male and female gender roles as fundamental to culture; the representation of culture, in literature especially and in the arts and humanities generally.
- 177-78 **Contemporary American Literature (3-3)** Moskowitz, Ganz, Chu  
Major and representative works, 1946-1980. Engl 177: poetry, fiction, and non-fiction by Flannery O'Connor, Ginsberg, Kerouac, Rich, Lowell, Plath, Mailer, Roethke, Baraka, Berryman, Ashbery, and others. Engl 178: essay, short story, and novel: Warren, Salinger, Agee, White, Cheever, Nabokov, Welty, Wilder, Olsen, Bellow, McPhee, and others.
- 182 **A Writer's Perspective on Literature (3)**  
Study of a literary topic, from the point of view of the Jenny McKean Moore Writer in Washington. May be repeated for credit. (Spring)
- 195-96 **Honors Seminar (3-3)** Romines, Sponsler  
Genre and genre theory; literature as cultural artifact and as instrument of cultural criticism; various critical approaches—ideological, historical, and ahistorical. Open only to second-semester junior and first-semester senior honors candidates in English. (Engl 195: spring; Engl 196: fall)
- 197 **Independent Study (3)** Plotz and Staff  
For exceptional students whose academic objectives are not accommodated in regular courses. Students must obtain the chair's approval and arrange for supervision by an appropriate member of the department. (Fall and spring)
- 198 **Honors Thesis (3)** Staff  
Under the guidance of an instructor, the student writes a thesis on an approved topic. Open only to senior honors candidates in English. (Fall and spring)
- 199 **Internship: Research and Writing (3)** Quitslund and Staff  
Position of responsibility with a publication or an educational or cultural institution or other organization offering practical experience in research and writing. Restricted to junior and senior English majors; requires departmental approval of plans prior to registration. Regular meetings with supervising professor.

## ENGLISH AS A FOREIGN LANGUAGE

Associate Professors G.R. Bozzini, S.M. Wright, C.F. Meloni, B.P. Tyndall (*Director*), M.A.P. Saunders

Assistant Professors F.C. Reid, E. Echeverria, M. Kirkland, S. Thompson, A.J.B. Covarrubias, J.K. Donaldson, Jr., P. Connerton, C.L. Iacobelli, M.B. Bandas, P.N. Edmondson, R.W. Tucker, C. Matthews

This comprehensive program in English as a foreign language is designed for persons enrolled or planning to enroll in University credit programs, for members of Washington's international community, and for other individuals who wish to improve their command of English through an intensive or semi-intensive study program. International students entering the program must take the EFL Placement Test before registering for any EFL course.

**Note:** The following course restrictions pertain to students enrolled in EFL courses. While enrolled in EFL 15, 20, and 30, students may not enroll in other courses. With permission of the advisor (in the case of Columbian College, permission of the dean), students enrolled in EFL 40 may take one other course, and students enrolled in EFL 45 may take two other courses.

In special cases and with the approval of the program, component parts of EFL 15, 20, 30, and 40 can be taken separately. Tuition rates and laboratory fees are charged accordingly.

**15 Basic English (0)**

Covarrubias, Echeverria

Introduction to basic grammar, vocabulary, and composition. Development of reading, speaking, and listening skills. Twenty class hours per week. Students registered in EFL 15 will not be permitted to register for any other academic course. Tuition is charged at the rate of seven credit hours; laboratory fee, \$70.

**20 Lower-Intermediate English (0)**

Iacobelli, Donaldson

Continued study of basic grammar. Continued practice in speaking, listening, reading, vocabulary, and composition. Emphasis on integration of skills. Twenty class hours per week. Students registered in EFL 20 will not be permitted to register for any other academic course. Tuition is charged at the rate of seven credit hours; laboratory fee, \$70.

**30 Intermediate English (0)**

Matthews, Connerton, Reid

Continued study of grammar; emphasis on complex structures. Further practice in reading, vocabulary, oral communication, and composition. Introduction to academic lectures and note taking. Twenty class hours per week. Students registered in EFL 30 will not be permitted to register for any other academic course. Tuition is charged at the rate of seven credit hours; laboratory fee, \$50.

**40 Higher-Intermediate English (0)**

Bandas, Reid, Meloni, Saunders, Thompson, Wright

Continued practice in complex grammar and related language skills. Reading academic material; basic research techniques. Twenty class hours per week. Students registered in EFL 40 may not take additional academic work without approval of their advisor. Tuition is charged at the rate of seven credit hours; laboratory fee, \$50.

**45 Semi-Intensive Advanced English (0)**

Edmondson, Tucker, Tyndall

Emphasis on the research/writing process. Practice in reading university-level materials. Focus on revision and editing. Additional class sessions are offered in specialized skills. Ten class hours per week. Tuition is charged at the rate of five credit hours.

**50 English Composition/Research Methods for International Students (3)**

Donaldson, Iacobelli, Kirkland

Composition and library research methods course for students who demonstrate high proficiency in English. Four class hours per week. This course can be taken by international students in lieu of Engl 9 or 10. Special fee, \$25.

**60 Advanced Oral Communication (3)**

Echeverria

For students who demonstrate high proficiency in English and wish to improve their formal oral communication skills. Emphasis on interviewing, preparing and delivering informative and persuasive speeches, and leading and participating in small-group discussions. Four class hours per week. Special fee, \$25.

**61 American Language and Culture (3)**

Echeverria, Covarrubias

For students who demonstrate high proficiency in English. Advanced English language skills taught through a study of currents in American thought, culture,



and civilization. Discussions are based on selected texts and periodical literature. Topics are highlighted by films, guest lecturers, and cultural activities. Four class hours per week. Special fee, \$25.

## ENVIRONMENTAL STUDIES

### Committee on Environmental Studies

H. Merchant (Chair), W.C. Parke, A. Viterito, A.M. Yezer

Columbian College and Graduate School of Arts and Sciences offers interdepartmental programs in environmental studies leading to the degree of Bachelor of Arts or Bachelor of Science. By emphasizing the social sciences, the program leading to the degree of Bachelor of Arts is designed to serve the student whose participation in the environmental decision-making process involves integrating information of a less technical nature. The program leading to the degree of Bachelor of Science prepares a student for a role in environmental decision making that involves the interpretation and use of technical information.

*Bachelor of Arts with a major in environmental studies*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses:

(a) Statistics—Stat 91.

(b) Natural sciences—6–8 credit hours selected from BiSc 3–4, 11–12; Chem 11–12, 17–18; Geol 1–2; or Phys 1, 2, 5, 6. BiSc 3–4 must be passed with a grade of A or B to be accepted toward fulfilling the introductory natural science requirement.

(c) Social sciences—Econ 11–12, plus 6 credit hours selected from Anth 1–2; Geog 1, 2, 3; PSc 1, 2; Psyc 1, 105–6; or Soc 1, 2.

3. Required courses for the major (51 credit hours):

(a) BiSc 154; Econ 136; Envr 151–52, 157; Geog 132 or 135.

(b) 9 credit hours selected from BiSc 102, 103, 104, 107, 108, 110, 112, 114, 126, 130, 134, 135, 137, 138, 140 or 142, 145, 152, 155, 156, 157, 208, 242, 243; Chem 22, 50, 122, 150, 151–52, 153–54; Geol 5, 105, 122, 124, 129, 151–52, 154; Phys 14, 15, 16.

(c) 24 credit hours in courses selected from no more than two departments in the following—Anth 150, 151, 152, 171, 188, 263, 267, 273; Econ 101, 102, 105, 157, 158, 161, 199, 237; Geog 106, 107, 108, 110, 127, 134, 136, 137, 140, 143, 145, 219, 220, 222; PSc 104, 111, 112, 117, 118, 120, 122, 124, 129; Psyc 104, 144, 146; Soc 120, 130, 143, 181. Up to 6 hours of credit in Envr 159–60 or 161 (or other approved field experience or internship courses) may be included in this category.

*Bachelor of Science with a major in environmental studies*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses:

(a) Statistics—Stat 91.

(b) Natural sciences—12–18 credit hours selected from BiSc 11–12; Chem 11–12, 17–18; Geol 1–2; Phys 1, 2, 5, 6. Either BiSc 11–12 or Chem 11–12 must be selected.

(c) Social sciences—Econ 11–12, plus 6 credit hours selected from Anth 1–2; Geog 1, 2, 3; PSc 1, 2; Psyc 1, 105–6; Soc 1, 2.

3. Required courses for the major (51 credit hours):

(a) BiSc 154; Econ 136; Envr 151–52, 157; Geog 132 or 135.

(b) 24 credit hours selected from BiSc 102, 103, 104, 107, 108, 110, 112, 114, 126, 130, 134, 135, 137, 138, 140 or 142, 145, 152, 155, 156, 157, 208, 242, 243; Chem 22, 50, 122, 150, 151–52, 153–54; Geol 5, 105, 122, 124, 129, 151–52, 154; Phys 14, 15, 16. Up to 6 hours of credit in Envr 159–60 or 161 (or other approved field experience or internship courses) may be included in this category.

(c) 9 credit hours in courses selected from no more than two departments in the following—Anth 150, 151, 152, 171, 188, 263, 267, 273; Econ 101, 102, 105, 157, 158, 161, 199, 237; Geog 106, 107, 108, 110, 127, 134, 136, 137, 140, 143, 145, 219, 220, 222; PSc 104, 111, 112, 117, 118, 120, 122, 124, 129; Psyc 104, 144, 146; Soc 120, 130, 143, 181.

The science and social science courses listed under 3(b) and 3(c) above must be taken in not more than three departments.

- 151-52 **Senior Seminar in Environmental Studies** (3-3) Merchant  
Directed reading and discussion of contemporary environmental problems. Limited to majors in environmental studies or with permission of instructor.
- 157 **Introduction to Environmental Law** (3) McGuirl  
An introduction to selected pieces of major environmental legislation. The role of the courts and bureaucracy in implementing and interpreting legislation. Impact on decision making. Designed for students with no training in law.
- 159-60 **Field Experience** (3-3) Staff  
Open to juniors and seniors majoring in environmental studies. Students spend at least eight hours per week in a political, technical, legal, or special-interest organization working on environmental questions.
- 161 **Environmental Policy Internship** (3 or 6) Staff  
For students interested in environmental policy and decision making at the national level. The course consists of an internship with a federal agency or public interest group concerned with environmental affairs, a weekly seminar based on directed readings, guest speaker presentations, and a major term paper. (Summer)

### EXERCISE SCIENCE AND TOURISM STUDIES

Professors D.C. Paup (Chair), D.E. Hawkins

Associate Professor B. Fernhall

Adjunct Associate Professor D. Frechtling

Assistant Professors P.A. Sullivan, L.A. Delpy, E.C. Rach

Instructor S.E. Spivack

Adjunct Instructors B.J. Westerman, R.L. Jarvis, R.L. Harrison, C.W. Warner, V.E. Jahelka, M.J. Schaffer, R. Thompson, J. Susman, W.L. Lebolt, J.R. Schoneboom, R.L. Luntz, D.L. Mandel

See the School of Education and Human Development for programs of study leading to the degree of Bachelor of Science in Exercise and Sport Science.

The University is not responsible for injuries received in any of the activities of the Department of Exercise Science and Tourism Studies, and the student assumes full responsibility therefor.

### EXERCISE AND SPORT ACTIVITIES

With the exception of students pursuing undergraduate degrees in the School of Education and Human Development, credit for exercise and sport activities courses is not recognized for the baccalaureate. Some exercise and sport activities courses may be repeated for credit by those students who are eligible to receive credit for such courses.

- |   |       |
|---|-------|
| 10 Beginning Badminton (1)  | Staff |
| 20 Beginning/Intermediate Golf (1)  | Staff |
| 21 Foil Fencing (1)   | Staff |
| 22 Basketball (1)   | Staff |
| 24 Volleyball (1)   | Staff |
| 26 Karate (1)   | Staff |
| 27 Tennis (1)   | Staff |
| 29 Yoga (1)   | Staff |
| 30 Fitness (1)  | Staff |
| 32 Beginning Swimming (1)   | Staff |
| 33 Swimming (1)   | Staff |
| 34 Intermediate Swimming (1)  | Staff |
| 38 Racquetball (1)  | Staff |
| 42 Aerobics (1)   | Staff |
| 43 Tai Chi (1)  | Staff |
| 44 Aikido (1)   | Staff |
| 45 Experimental Activities (1)  | Staff |
| Topic and amount of laboratory fee (if charged) announced in <i>Schedule of Classes</i> . May be repeated for credit.                       |       |
| 50 CPR and First Aid (2)  | Staff |
| Training for certification in cardiopulmonary resuscitation and first aid. Laboratory fee, amount announced in <i>Schedule of Classes</i> . |       |



- 54 **Intermediate/Advanced Tennis** (2) Staff  
Development of skills, theories of strategy; emphasis on competitive play as a lifetime sport.
- 55 **Water Safety Instructor Certification** (2) Staff
- 56 **Scuba Diving** (2) Staff  
Laboratory fee, amount announced in *Schedule of Classes*. Personal equipment fee, amount announced at first class meeting.
- 59 **Team Sports** (2) Staff
- 60 **Racket Sports** (2) Staff
- 61 **Lifeguard/Lifeguard Instructor** (2) Staff  
Laboratory fee, \$10.
- 62 **Conditioning/Weight Training** (2) Staff
- 65 **Skiing** (2) Staff  
Laboratory fee, amount announced in *Schedule of Classes*. (Spring)
- 68 **Sport Clinics and Workshops** (1 to 3) Staff  
Special intensive study and skill development. There may be a laboratory fee, amount announced in *Schedule of Classes*.

### EXERCISE SCIENCE

- 101 **Experimental Course** (3) Staff  
Topic to be announced in *Schedule of Classes*.
- 103 **Professional Foundations of Exercise and Sport Science** (3) Delpy  
Nature, scope, and scientific basis of exercise and sport science; orientation to professional competencies.
- 107 **Personal Health and Wellness** (3) Delpy, Sullivan  
A survey of the various components involved in personal health and wellness, such as personal fitness, sexuality, mental health, and environmental health. Emphasis is on application of knowledge through the use of decision making and behavior modification skills.
- 109 **Fitness Testing and Prescription** (3) Paup  
Evaluation of aerobic capacity, muscular strength, flexibility, and ideal body weight; development of prescribed exercise programs. Laboratory fee, \$40. (Fall)
- 110 **Supervision and Leadership of Exercise and Sport Programs** (3) Sullivan  
Concepts and techniques of the supervision and management of fitness programs and personnel. (Spring)
- 111 **Directing and Planning Physical Fitness Activities** (3) Staff  
Concepts and techniques involved in planning and directing physical fitness classes, such as weight training, aerobics, and general fitness. (Fall)
- 112 **Organization and Management of Sport Activities** (3) Staff  
Concepts and techniques involved in organizing and managing a variety of individual and team sports. (Spring)
- 122 **Methods and Materials for Health Education** (3) Schaffer  
Conceptual approach to curriculum design and teaching, including planning and organization, methodology, selection and use of materials, and evaluation: basic health knowledge. (Spring)
- 130 **Introduction to Motor Development and Life-Span Fitness** (3) Staff  
Study of the evolution and refinement of fundamental movement skills throughout the life span. (Fall)
- 134 **Sport and Nutrition** (3) Jahelka  
The nutrition needs for recreational exercise and sports; skills in assessing nutrition needs; development of individual nutrition programs that are sport/activity-specific; and identification and correction of nutrition problems affecting sports performance. (Fall)
- 135 **Sports and the Law** (3) Warner  
Basic principles of the law as it applies to amateur and professional sports. Legal issues and their ramifications. (Spring)
- 138 **Introduction to Sport Management** (3) Delpy, Sullivan  
Introduction to concepts of management related to sport and exercise program.

- 139 Principles of Coaching (3)** Sullivan  
Study of coach/athlete behavioral patterns and interactions, coaching methods, and interdisciplinary principles applicable to coaching. (Spring)
- 140 Exercise and Sport Psychology (3)** Sullivan  
Study of psychological aspects of sport participants, athletes, teams, and competition in sport situations, including personality, motivation, performance level, achievement, and behavioral change strategies; social factors, training events, and measurement techniques. (Fall)
- 145 Working, Stress, and Human Values (3)** Nashman  
Recognition, prevention, and control of stress and the burnout syndrome. A humanistic inquiry into values, attitudes, and stressors associated with various professions. Admission by permission of instructor. (Fall)
- 146 Stress Management, Burnout, and Human Potential (3)** Nashman  
The nature, prevention, and control of the stress and burnout syndrome. Students will design an overall stress management strategy that incorporates achievement of life goals and human potential in a stress-efficient manner. Admission by permission of instructor. (Spring)
- 150 Introduction to Human Anatomy (3)** Lebolt  
Systematic study of the structure of the human body, with emphasis on joints, muscles, and neuromuscular mechanisms. (Fall)
- 151 Kinesiology (3)** Lebolt, Paup  
Analysis of human movement with emphasis on the biomechanics of exercise and sport movement patterns. Prerequisite: an approved course in anatomy. (Spring)
- 152 Physiology of Exercise (3)** Fernhall  
The physiological functions of the body and the effect of exercise on these functions. Prerequisite: ExSc 150 or permission of instructor. Laboratory fee, \$40. (Fall)
- 158 Safety: Prevention and Care of Sports Injuries (3)** Westerman  
Safety education, liability, prevention and care of sports injuries; related personnel, facilities, and equipment. Laboratory fee, \$40.
- 159 Athletic Training and Rehabilitation (3)** Westerman  
The course is designed to provide lectures and lab sessions dealing with upper and lower extremities for injury evaluation techniques, the use of therapeutic modalities, and rehabilitation techniques. Prerequisite: ExSc 158. Laboratory fee, \$40. (Spring)
- 161-62 Practicum (3-3)** Paup, Delpy  
For departmental majors and minors only. Practical experience in related disciplines. May be repeated for credit. (Academic year)
- 171 Issues in Exercise and Sport Science (3)** Sullivan  
Study of current literature with implications for exercise and sport science specializations; use of library resources and retrieval systems; evaluation of professional competencies. Prerequisite: ExSc 103 or permission of instructor. (Spring)
- 172 International Experiences (1 to 6)** Delpy  
For departmental majors only. Travel to a foreign country for study of a specific topic.
- 173 Independent Study (1 to 3)** Paup  
For departmental majors only. Individually designed model for intensive study in an area of special interest. Prerequisite: demonstrated competency for independent work and permission of advisor and instructor. May be repeated for credit.
- 175 Internship (3 to 9)** Paup  
For departmental majors only. Prerequisite: ExSc 161-62 or equivalent. Admission by permission of advisor. (Fall, spring, and summer)
- 184 Workshop (1 to 3)** Staff  
Topic to be announced in *Schedule of Classes*. May be repeated for credit with permission of advisor.

## TOURISM STUDIES

- 101 Experimental Course (3)** Staff  
Topics announced in the *Schedule of Classes*.



- 104 Introduction to Tourism Studies (3)** Spivack  
Survey of the travel and tourism industry with emphasis on marketing tourism and travel, research and development of tourist destinations, and the economic and social impact of tourism. (Fall, spring, and summer)
- 113-14 Practicum (3-3)** Hawkins  
For departmental majors only. Practical experience in travel and tourism related disciplines. (Academic year and summer)
- 143 Tourist Accommodations and the Hospitality Industry (3)** Staff  
An overview of the basic principles involved in the management, operations, marketing, and financing of hotels, restaurants, and other tourist accommodations, facilities, and services. (Spring)
- 144 Tourist Attractions and Activities (3)** Spivack  
Basic principles of planning, developing, and managing natural and man-made attractions. National, state, and local park systems, as well as private sector resorts, theme parks, and other tourist attractions are examined. Various recreation activities popular among tourists are examined in view of their personal, economic, social, and environmental impacts. (Spring)
- 145 Travel and Tourism Advertising, Public Relations, and Sales Techniques (3)** Frechtling  
Reviews and applies basic advertising, public relations, and sales techniques to the tourism field. Includes study of effective techniques and selected case studies and current practices. (Spring)
- 146 Tourist Characteristics and Behavior (3)** Staff  
Socioeconomic, demographic, and psychological characteristics of various types of tourist populations. Emphasis on tourist behavior in planning, developing, and marketing tourism programs and services. Cultural differences as they influence travel. (Fall)
- 147 Travel and Tourism Transportation Systems (3)** Staff  
Overview of the various transportation modes. Planning, financial, operational, marketing, and evaluation aspects of the different systems of transportation. Limited emphasis on the development of travel distribution systems to support specific transportation modes. (Fall)
- 172 International Experiences (1 to 12)** Staff  
For departmental majors only. Travel to a foreign country for study of a specific topic. (Fall, spring, and summer)
- 173 Independent Study (1 to 6)** Staff  
For departmental majors only. Individually designed model for intensive study in an area of special interest. Prerequisite: demonstrated competency for independent work and permission of advisor and instructor. May be repeated for credit. (Fall, spring, and summer)
- 178 Designing and Implementing Conferences and Meetings (3)** Staff  
Same as HRD 178.
- 184 Workshop (1 to 6)** Staff  
Topics announced in the *Schedule of Classes*. May be repeated for credit with permission of advisor. (Fall, spring, and summer)
- 193 Domestic and International Tourism Destinations (3)** Staff  
Physical and cultural geography of major tourist destinations. Guest-host relationships; information systems. (Spring)

## FINANCE

Professors F. Amling, T.M. Barnhill (Chair), W.E. Seale, W. Handorf  
 Professorial Lecturer T. Curry  
 Associate Professors J.M. Sachlis, N.G. Cohen, P.S. Peyser, M.S. Klock  
 Associate Professorial Lecturer R. Strand  
 Assistant Professors S.K. Bryant, G.M. Jabbour, M. Humber (Visiting)  
 Assistant Professorial Lecturer R. Petruska

See the School of Business and Public Management for programs of study leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration.

- 120 Business Finance (3)** Handorf, Sachlis, and Staff  
Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, risk analysis, capital budgeting and structure, cost of capital and dividend policy. Prerequisite: Accy 51-52; Econ 12; Math 51-52; Stat 51. (Fall and spring)
- 123 Investment and Portfolio Management (3)** Jabbour  
Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Fina 120. (Fall and spring)
- 124 Advanced Financial Management (3)** Cohen  
Analysis and readings covering applications of theory to financial management. Case studies for decision making involving working capital, capital budgeting, financing, dividend policy, and valuation. Prerequisite: Fina 120. (Fall and spring)
- 130 Working Capital Management (3)** Staff  
The analysis of corporate short-term sources and uses of funds. Optimization techniques and case studies emphasized. Bank lending practices are evaluated within the working capital area. Prerequisite: Fina 120. (Spring)
- 132 Real Estate Investment (3)** Handorf  
Principles of real estate investment, including valuation, appraisal, financing, and development, in addition to a discussion of the mortgage market and its institutions. Prerequisite: Fina 120. (Fall and spring)
- 133 Fundamentals of Insurance and Risk Management (3)** Staff  
Functions of insurance and risk management in business enterprise. (Spring)
- 135 Capital Formation (3)** Handorf and Staff  
The process of capital formation in a free enterprise economy. Roles of business firms, financial intermediaries, money and capital market institutions, governmental regulatory agencies, fiscal and monetary policies. Prerequisite: Fina 120. (Fall and spring)
- 190 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods.
- 199 Individual Research (arr.)**  
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

## FRENCH

See Romance Languages and Literatures.

## GEOGRAPHY AND REGIONAL SCIENCE

Professors J.C. Lowe, D.E. Vermeer (Chair)  
Professorial Lecturers E. Marasciulo, B. Thomas, G.T. Foggin  
Associate Professorial Lecturers J.A. Zinn, S.E.S. Mastran, W.B. Wood  
Assistant Professors A. Viterito, M.W. Lewis, D.M. Hart, M.D. Price

Bachelor of Arts with a major in geography—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in the major—Geog 1, 2, 195; nine 100-level geography and regional science courses to be chosen in consultation and with the approval of the undergraduate advisor. One course must be chosen from each of the following: Group A—Geog 108, 110, 132, 136; Group B—Geog 125, 126, 140, 141; Group C—Geog 127, 133, 145, 146; Group D—Geog 104, 105, 106, 107.

Minor in geography—Required: 21 credit hours, including Geog 1, 2, and one course from each of the following groups: Group A—Geog 127, 145, 146; Group B—Geog 125, 126, 141; Group C—Geog 108, 110, 137; Group D—Geog 132, 134, 135, 136; Group E—Geog 124, 140, 143.



With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- 1 **Introduction to Human Geography** (3) Lowe, Lewis, Vermeer  
A systematic survey of human geography; cultural perspectives on the use of space, including urbanization, geopolitics, and land use. (Fall and spring)
- 2 **Introduction to Environmental Geography** (3) Price, Vermeer, Viterito  
A systematic survey of environmental geography; perspectives on environments and human ecology, including ecosystems and their use, human population dynamics, and resource geography. (Fall and spring)
- 3 **The Physical Environment** (3) Staff  
A study of the earth's physical environment, its systems, subsystems, and physical processes. Laboratory fee, \$30.
- 104 **Maps and Mapmaking** (3) Staff  
Descriptive and statistical techniques for thematic mapping; computer cartography. Laboratory fee, \$30.
- 105 **Techniques of Spatial Analysis** (3) Viterito  
Nature of geographical inquiry, approaches to the study of geography, empirical research methods.
- 106 **Geographic Information Systems** (3) Viterito  
Analysis of cartographic data structures and automated databases. Digitizing and plotting techniques. Laboratory fee, \$30.
- 107 **Remote Sensing and Air Photo Interpretation** (3) Thomas  
Remote-sensing techniques using aerial photography, color infrared, microwave, and satellite imagery. Application to rural and urban settings, archaeology, and environmental monitoring. Laboratory fee, \$30.
- 108 **Weather and Climate** (3) Viterito  
An examination of atmospheric processes and climatic regions. Laboratory fee, \$30. Prerequisite: Geog 2.
- 110 **Climate and Human Ecology** (3) Viterito  
Effects of climate on human activities. Examination of human-induced climate change. Prerequisite: Geog 2.
- 115 **Meso-American Field Program** (3 or 6) Humphrey, Mergen, Price  
Same as AmCv/Anth 115.
- 120 **World Regions: Problems and Prospects** (3) Lewis  
Understanding of world environmental and cultural regions; the natural and human conditions that undergird current problems and future prospects.
- 121 **Computer Mapping** (3) Staff  
Analysis and application of computer mapping methods. Examination of FORTRAN and BASIC programming methods as they apply to cartography. Laboratory fee, \$30.
- 124 **Urban Transportation** (3) Lowe  
The relationship between freight and passenger transportation systems and urban land use patterns and structure. Prerequisite: Geog 1.
- 125 **Transportation and Communication** (3) Lowe  
The structure and evolution of transportation and communication networks and their impact on regional development. Prerequisite: Geog 1.
- 126 **Location in Manufacturing and Agriculture** (3) Hart  
Theories dealing with the location and dynamics of economic activities. Prerequisite: Geog 1.
- 127 **Population and Settlement** (3) Hart  
Patterns of world population; factors contributing to population pressures, growth, and migrations. Prerequisite: Geog 1.
- 132 **Resource Management and Conservation** (3) Lewis  
The global distribution, utilization, and degradation of natural resources. Prerequisite: Geog 2.
- 133 **People, Land, and Food** (3) Price  
Spatial disparities in world food production, demand, and distribution; regional food-population balances; food supply problems and prospects. Prerequisite: Geog 1 or 2.

- 134 Energy Resources (3)** Price  
Analysis of regional patterns and trends in consumption and production of energy resources. Examination of international energy linkages and energy policies of selected nations. Prerequisite: Geog 2.
- 135 Resources and Environmental Quality (3)** Lewis  
Investigations into questions of resource use and environmental quality. Emphasis on public policy and societal attitudes as they influence resource use. Prerequisite: Geog 2.
- 136 Water Resources (3)** Viterito, Lewis  
Analysis of the global spatial patterns, development, and use of water resources. Prerequisite: Geog 2.
- 137 Environmental Hazards (3)** Viterito  
Examination of natural hazards in terms of their types, distributions, and impacts on human activities. Prerequisite: Geog 2.
- 140 Urban Form and Dynamics (3)** Lowe  
Analysis of the internal spatial structure of cities; emphasis on explaining patterns and dynamics of location within the city. Prerequisite: Geog 1.
- 141 Urban Settlement in the Developing World (3)** Hart  
Urbanization processes, problems, and management in the developing world. Focus on urban location, politics, housing, services, employment, and environmental issues. Prerequisite: Geog 1. (Fall)
- 143 Urban Social Geography (3)** Lowe, Hart  
Behavioral perspectives on human spatial activities in cities. Prerequisite: Geog 1.
- 144 Explorations in Historical Geography (3)** Mondale  
Examination of selected themes in the cultural geography of the United States over the course of its history, in relation to an overview of the historical geography of the country. Same as AmCv 144. (Spring)
- 145 The Cultural Landscape (3)** Lewis  
Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations. Prerequisite: Geog 1.
- 146 Politics in Place and Space (3)** Price  
Interrelationships among the human and physical environment and political systems; the organization of political territories. Prerequisite: Geog 1.
- 147 Military Geography (3)** Staff  
An examination of environmental and locational factors and their impact on military planning and operations. Prerequisite: Geog 1 or 2.
- 151 Geography of North America (3)** Foggin  
An examination of the social, environmental, and economic factors that have led to development of the several regions of the U.S. and Canada. Prerequisite: Geog 1 or 2.
- 154 Geography of the Middle East and North Africa (3)** Staff  
Cultural and physical regional patterns of the Middle East and North Africa. Prerequisite: Geog 1 or 2.
- 161 Geography of Latin America (3)** Price  
Examination of spatial characteristics of physical and cultural phenomena in Middle and South America. Prerequisite: Geog 1 or 2.
- 164 Geography of Africa (3)** Hart, Vermeer  
Cultural and physical regional patterns of Africa. Prerequisite: Geog 1 or 2.
- 189-90 Readings in Geography (arr.)** Staff  
Prerequisite: 12 credit hours of geography and permission of instructor.
- 195 Proseminar in Geographic Thought (3)** Staff  
For students completing the major in geography. Development of geographic thought, theories, and methodologies; geographic curricula. Prerequisite: permission of the advisor. (Fall)
- 198 Special Topics (3)** Staff  
Consideration of geographic aspects of topical and future problems of society. May be repeated for credit provided that the topic differs. Prerequisite: Geog 1 or 2.
- 199 Internship (3)** Staff  
Fieldwork, internship, or other controlled assignment with an agency or organization engaged in work in applied geography. Prerequisite: 12 credit hours of geography courses and permission of instructor.



**GEOLOGY**

Professors F.R. Siegel, R.C. Lindholm, J.F. Lewis, G.C. Stephens (Chair)  
 Associate Professorial Lecturer J.H. Kravitz  
 Assistant Professors R.P. Tollo, L.E. Osterman  
 Assistant Professorial Lecturers G.B. Rabchevsky, M.K. Brett-Surman  
 Lecturer R.T. Rye

*Bachelor of Arts or Bachelor of Science with a major in geology*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required introductory course—Geol 1–2.
3. Required courses in related areas—(a) Chem 11–12; (b) Math 30 (for the degree of Bachelor of Arts) or Math 30 and 31 (for the degree of Bachelor of Science); (c) Stat 91; and (d) BiSc 11 or 12 or Phys 1 (for the Bachelor of Arts) or BiSc 11 or 12 and Phys 1 (for the Bachelor of Science).
4. Required courses in the major—Geol 111, 112, 117, 118, 122, 151, and 261 (Sedimentology) for both the degrees of Bachelor of Arts and Bachelor of Science; Geol 166, 189, 195 for the Bachelor of Science degree only.

For graduation with Special Honors, a student must have an overall grade-point average of 3.3 plus the recommendation of the department; must take Geol 199 for 2 or 3 credit hours; and must submit an approved honors thesis or project report.

*Minor in geology*—18 credit hours selected with approval of the departmental advisor to undergraduates, including 6 hours of introductory geology (Geol 1–2; 5 and 105); two courses selected from Geol 101, 111, 122, 151; and two from Geol 124, 125, 128, 150, 261, or from requirements of the B.A. and B.S. (For students with special interdisciplinary interests, substitutions can be arranged.)

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- 1 **Introductory Physical Geology** (3) Lindholm, Rye, Stephens, Tollo  
 Lecture (2½ hours), laboratory (2 hours). An introduction to the principal features of the composition and structure of the earth. Topics include nature of minerals and rocks, physical processes, energy resources, and plate tectonics. Laboratory fee, \$30. Credit will not be given for both Geol 1 and 5. (Fall and spring)
- 2 **Introductory Historical Geology** (3) Lindholm, Osterman, Rye  
 Lecture (2½ hours), laboratory (2 hours). An introduction to the history of the earth. Topics include sedimentary environments, plate tectonics, origin of life, and evolution. Laboratory fee \$30. Prerequisite: Geol 1 or 5. (Fall and spring)
- 5 **Environmental Geology** (3) Lewis, Siegel  
 Lecture (2½ hours), laboratory (2 hours). An introduction to the principal features of physical geology, with emphasis on the relation of people and society to natural environments; population evolution, natural hazards, and mineral resources; economic, legal, and political aspects. Laboratory fee, \$30. Credit will not be given for both Geol 1 and 5. (Fall and spring)
- 101 **Rocks and Minerals** (3) Lindholm  
 Lecture and laboratory; field trips as arranged. Identification of gemstones and other minerals, especially crystals. Classification and interpretation of rocks, based on their minerals, textures, primary structures, and present-day processes. Field trips demonstrate rock structures and genetic associations. Prerequisite: Geol 1 or 5. Laboratory fee, \$30. (Spring)
- 105 **Geological Hazards in Land-Use Planning** (3) Siegel  
 Lecture and laboratory. An analysis of geological hazards and related factors that affect land-use planning. Field trip. Prerequisite: Geol 5 or permission of instructor. Laboratory fee, \$25. (Spring)
- 111 **Mineralogy** (4) Tollo  
 Lecture and laboratory. Introduction to the crystallography and chemical systematics of rock-forming and exotic minerals. Exercises emphasize the analysis of

- mineralogic data and the paragenesis of mineral assemblages. Prerequisite: Geol 1; Chem 11 (may be taken concurrently); or permission of instructor. Laboratory fee, \$25. (Fall)
- 112 **Optical Mineralogy (4)** Tollo  
Lecture and laboratory. Introduction to basic light theory and the identification and characterization of minerals through optical properties. Laboratory exercises provide an introduction to the petrologic analysis of igneous and metamorphic mineral systems. Prerequisite: Geol 111 or permission of the instructor. Laboratory fee, \$30. (Spring)
- 117 **Petrology (2)** Lewis  
Introduction to silicate phase systems; physics and chemistry of crustal and magmatic processes; volcanic processes and products. Prerequisite: Geol 1, 111, 112; Phys 1 or equivalent; or permission of instructor. (Fall)
- 118 **Petrology Laboratory (2)** Lewis  
Concurrent registration in Geol 117 required for geology majors. Prerequisite: Geol 111 and 112. Laboratory fee, \$30. (Fall)
- 122 **Structural Geology (4)** Stephens  
Study of natural and experimental rock deformation and the relationships between stress and strain as recorded by geologic structures. Prerequisite: Geol 1-2. Laboratory fee, \$25. (Fall)
- 124 **Geologic Map Interpretation (2)** Stephens  
Interpretation and analysis of geologic maps and cross sections. Prerequisite: Geol 122. Laboratory fee, \$25. (Spring)
- 125 **Marine Geology (3)** Kravitz  
Lecture and map work. Principles of oceanography and submarine geology; topography, crustal structure, sedimentary processes, and marine environment. Prerequisite: Geol 1 or permission of instructor. (Spring)
- 128 **Geomorphology (3)** Osterman, Rabchevsky  
Lecture (2 hours), laboratory (2 hours). Nature, origin, and development of landforms; identification using maps and photos. Prerequisite: Geol 1. Laboratory fee, \$25. (Spring)
- 136 **Introduction to Engineering Geology (3)** Lewis  
For students in the School of Engineering and Applied Science. Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Phys 2 or equivalent, or permission of instructor. Laboratory fee, \$30. (Spring)
- 150 **Dinosaurs: Evolution and Natural History (3)** Brett-Surman  
An introductory course on the natural history of dinosaurs—their evolution, biology, and ecology, their false portrayal in the press, and how scientists study them. (Spring and summer)
- 151-52 **Invertebrate Paleontology (3-3)** Staff  
Biology, taxonomy, functional morphology, and evolutionary patterns of the invertebrate fossil groups, with emphasis on the macroinvertebrates. Prerequisite: Geol 1-2 or permission of instructor. Laboratory fee, \$25 per semester. (Academic year)
- 154 **Vertebrate Paleontology (3)** Brett-Surman  
Lecture (2 hours), laboratory or field work as arranged. General features of vertebrate morphology and evolution; problems of paleoecology and adaptation. (Fall, odd years)
- 166 **Principles of Stratigraphy (3)** Staff  
Fundamentals of stratigraphic principles and practice. Review of historical concepts, section measuring, vertical and lateral lithostratigraphic relationships, magnetic and climatic stratigraphy, biostratigraphic classification, zonation, correlation, geochronology, facies, and stratigraphic maps. Prerequisite: Geol 151 and 261 (Sedimentology) or permission of instructor. (Fall)
- 189 **Geophysics for Geologists (3)** Stephens  
Principles of magnetic, gravity, seismic and electrical methods applied to geological problem-solving. Prerequisite: Geol 122; Math 31; Phys 1; or permission of instructor. (Spring)
- 195 **Field Methods (3)** Tollo, Lindholm, Stephens  
Weekend field trips. Methods of outcrop analysis, geologic mapping, and data interpretation. Students will be responsible for room and board expenses while at



field camp (one week). Prerequisite: Geol 122. Laboratory fee (field trip fee), \$30. (Spring, odd years)

- 199 **Undergraduate Research or Reading** (arr.) Staff  
Problems approved by the staff. May be repeated once for credit. (Fall and spring)

## GERMANIC LANGUAGES AND LITERATURES

Professors K. Thoenelt, C. Steiner (Chair), J.C. King (Emeritus)

Associate Professorial Lecturers G.A. Furner, P. Werres

Assistant Professor B.M. Sachs

*Bachelor of Arts with a major in Germanic languages and literatures*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Ger 1-2, 3-4 (Ger 5-6 may be substituted), 9-10, 51-52, or equivalent.
3. Required courses in other areas—6 credit hours in one of the following subjects: art history, music history, philosophy, or history of Germany.
4. Requirements for the major—a minimum of 24 credit hours in 100-level German courses, including Ger 179-80; reasonable proficiency in speaking, reading, and writing German as determined by the department.

*Special Honors*—In addition to the general requirements stated under University Regulations, a candidate for special honors in German must submit an acceptable senior thesis on an assigned topic.

*Minor in German*—Required: Ger 9-10, 51-52, and 6 credit hours of 100-level courses. Prerequisite: Ger 1-2, 3-4 (Ger 5-6 may be substituted), or equivalent.

**Placement Examination:** A student who has not been granted advanced standing and who wishes to continue in college the language study begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

- 1-2 **First-Year German** (3-3) Staff

Structure of the German language: basic vocabulary, reading, writing, and conversation; the culture of German-speaking areas. Three hours in the classroom and one in the language laboratory each week. Laboratory fee, \$50 per semester. Prerequisite to Ger 2: Ger 1 or equivalent. (Fall and spring)

- 3-4 **Second-Year German** (3-3) Staff

Continued study of the structure of the German language; vocabulary, reading, writing, and conversation; culture and literature of Germany, Austria, and Switzerland. Three hours in the classroom and one in the language laboratory each week. Laboratory fee, \$50 per semester. Prerequisite to Ger 3: Ger 1-2 or 5, or equivalent. Prerequisite to Ger 4: Ger 3 or equivalent. (Fall and spring)

- 5-6 **Intensive Beginning and Intermediate German** (6-6) Furner

Six hours in the classroom and two in the language laboratory each week. Ger 5 is equivalent to Ger 1-2; Ger 6 is equivalent to Ger 3-4. Laboratory fee, \$70 per semester. Prerequisite to Ger 6: Ger 1-2 or 5, or equivalent. (Academic year)

- 9-10 **German Conversation and Composition** (3-3) Steiner and Staff

A third-year language course; German as a means of spoken and written communication. German cultural history from its historical roots to the present day. Prerequisite: Ger 3-4 or 6, or equivalent. With permission of instructor, Ger 9 or 10 may be taken concurrently with Ger 4. (Academic year)

- 47 **Beginning German for Reading Acquisition** (3) Staff

For undergraduate and graduate students with little or no German who are interested in acquiring a reading knowledge of German. No academic credit for graduate students. (Summer)

- 49 **German Readings for Nonmajor Students** (3) Staff

Primarily for graduate students preparing for reading examinations; undergraduates admitted. No academic credit for graduate students. Prerequisite: Ger 4, 6, or 47, or equivalent. (Summer)

- 51-52 **Introduction to German Literature—in English** (3-3) Thoenelt  
 Ger 51—The birth of modern individualism, and the 18th-century youth movement leading to the German idyll. Ger 52—German thought and civilization, from 1770 to the present. The two faces of contemporary Germany: Goethe and German culture versus German politics. (Academic year)
- 103-4 **Major Themes of German Literature—in English** (3-3) Thoenelt and Staff  
 Ger 103—The Faust myth in Western literature. Faust figures in the works of Goethe, Dostoevsky, Stephen Vincent Benét, Thomas Mann, and Ibsen. Ger 104—Literature and politics in Germany. Selected readings include Kant, Goethe, Schiller, Marx, Heine, Nietzsche, Thomas Mann, Heinrich Mann, Brecht, and Böll. (Alternate academic years)
- 112 **Comparative Studies in Germanic and European Letters—in English** (3) Thoenelt and Staff  
 Why literature? What is literature? Views and perspectives on the "usefulness" and "uselessness" of literature in modern Western societies. Selected works and excerpts from Plato, Aristotle, Shakespeare, Montaigne, Lessing, Goethe, Schiller, Nietzsche, Thomas Mann, Camus, Böll, and others. (Spring, alternate years)
- 114 **Four Western Ways of Life—in English** (3) Thoenelt and Staff  
 The human condition and four Western ways of life: French moralism, German *Bildung*, Marxism, and existentialism. Selected readings from Montaigne, Goethe, Schiller, Thomas Mann, Marx, Brecht, Nietzsche, Martin Buber, and Camus. (Fall, alternate years)
- 125 **Utopias and Dystopias in German Letters and Thought—in English** (3) Sachs  
 The unfolding German intellectual genius, now at a moral peak, now perverted. Selected readings and excerpts from the works of Lessing, Bonaventura, Heine, Marx, Nietzsche, Hitler, Thomas Mann, and Hermann Hesse. (Fall, alternate years)
- 126 **France and Germany—in English** (3) Sachs  
 Comparative study of two European ways of life as reflected and perpetuated by literature and philosophy. Relevant excerpts and documents from the 16th to the 20th century. (Spring, alternate years)
- 131-32 **18th-Century German Life and Letters—in German** (3-3) Thoenelt  
 Germany as the country of poets and thinkers. Readings in literature, education, philosophy, religion, and politics by Wolfram von Eschenbach, Luther, Lessing, Kant, Goethe, Schiller, Schleiermacher, Wilhelm von Humboldt, Thomas Mann, and Rudolf Steiner. (Alternate academic years)
- 141-42 **19th-Century German Literature—in German** (3-3) Steiner  
 Romanticism, Biedermeier, Young Germany, Poetic Realism. Second age of chivalry and Sehnsucht, revolution and counterrevolution in thought and literature. Development of modern nationalism and cosmopolitanism as reflected in the literature of the period. Reading, lecture, and discussion. (Alternate academic years)
- 151-52 **20th-Century German Literature—in German** (3-3) Steiner  
 The age of Nietzsche, Naturalism, Impressionism, Expressionism; Kafka, Thomas Mann, Hermann Hesse; émigré literature, contemporary drama; authors of Gruppe 47. Reading, lecture, and discussion. (Alternate academic years)
- 161-62 **Studies in Germanic Languages and Literatures—in English** (3-3) Sachs  
 Germanic mythology—characters, tales, and motifs. Runes as a cultic device. Introduction to the pre-Christian religion of the Germanic peoples and to an interdisciplinary study of mythology. (Alternate academic years)
- 179-80 **Advanced German Conversation and Composition** (3-3) Thoenelt  
 A fourth-year language course designed to achieve near-native fluency in speaking and writing German. Discussions and compositions on literary and cultural topics, reading of the German weekly newspaper *Die Zeit*, interpretations of selected texts (Gottfried Benn and Thomas Mann), grammatical and stylistic studies. Prerequisite: Ger 9-10 or equivalent. (Alternate academic years)

## GREEK

See Classics.



**HEBREW**

See *Classics*.

**HISTORY**

Professors H.M. Sachar, P.P. Hill, L.G. DePauw, R. Thornton, L.G. Schwoerer, P.F. Klarén, R.E. Kennedy, Jr., W.H. Becker (Chair), L.P. Ribuffo, E. Berkowitz, R. Spector, J.O. Horton  
Associate Professors C.J. Herber, W.R. Johnson, R.A. Hadley, A.D. Andrews, M.A. Atkin,  
R.B. Stott, H.L. Agnew

Adjunct Associate Professor K. Bowling

Assistant Professors G. Savage, D.R. Khoury

*Bachelor of Arts with a major in history*—The following requirements must be fulfilled:

1. Majors must meet the general requirements of Columbian College and Graduate School of Arts and Sciences, selecting specific courses in consultation with either a departmental or college advisor. For the foreign language or culture requirement, majors must meet the foreign language, rather than foreign culture, requirement.

2. Majors must either take or waive the introductory courses Hist 39–40 and 71–72. Waiver may be accomplished by passing a departmental examination, which is held near the beginning of classes. Credit as well as waiver may be obtained also by departmental examination, or by scoring above 600 on College Board Achievement Tests, or by scoring 4 or 5 on Advanced Placement Examinations. Neither waiver nor credit is awarded by CLEP subject examination.

3. Distributed courses within the major must include (for a total of 24 credit hours) Hist 198, 199, and two 100-level courses in each of the following three fields:

- (a) Europe—Hist 105, 106, 109, 110, 111, 112, 121, 122, 123, 124, 125, 127, 131, 132, 136, 139, 140, 141, 142, 147, 148, 149, 150, 151, 152, 153, 154, 155, 157, 158, 183
- (b) United States—Hist 117, 118, 128, 129, 133, 134, 137, 138, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 184, 185, 186, 197
- (c) Russia, Asia, Africa, and Latin America—Hist 107, 108, 116, 119, 120, 145, 146, 158, 161, 162, 163, 164, 165, 166, 187, 188, 189, 193, 194, 195, 196

Special topics courses numbered 101 and courses in the 700 Series may also satisfy one of the three field requirements. Majors should check with the major advisor on the applicability of such courses.

For Special Honors in history, a history major must meet the general honors requirements listed under University Regulations. In addition, the Department requires candidates to apply for the special honors program before the end of the first semester of the junior year. During the junior year, candidates for the program must receive a grade of A in a 3-hour research seminar, preferably taken with the professor who will advise the senior thesis. Candidates admitted to the program will subsequently enroll in the research seminar, Hist 191, and complete a senior honors thesis in Hist 192 during their last semester. Only if the thesis merits the grade of A will Special Honors be recommended.

*Minor in history*—Undergraduate students who select a minor in history must ordinarily declare their intention to the departmental advisor no later than the beginning of their senior year. Such students may choose a nonspecialized history curriculum, or may concentrate in one area, such as ancient history, medieval history, early modern Europe, modern Europe, the Middle East, Russia and East Europe, the United States, Latin America, or the Far East, or in one field, such as economic, social, intellectual, diplomatic, political, black, or women's history. In each case the program of courses will be planned in consultation with the history advisor. To meet the departmental requirements for a minor, the student must complete one course chosen from Hist 39, 40, 71, or 72 and at least five additional approved history courses with a grade of C– or above. Hist 199 must be included in the program.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Waiver Examinations:** Waiver examinations are given three times per year, near the beginning of classes in the fall and spring semesters and the first summer session.

**Course Accessibility:** All 100-level courses are open to students without history course prerequisites with the exception of Hist 157, 198, and 199.

- 39-40 **European Civilization in Its World Context** (3-3) Staff  
Hist 39: Introduction to the political, social, economic, religious, and cultural history of Europe from about 800 A.D. to 1715. Hist 40: From 1715 to the present. (Academic year)
- 50 **Washington, D.C.: History, Culture, and Politics** (3) Gillette  
Same as AmCv/PSc 50.
- 71-72 **Introduction to American History** (3-3) Staff  
Hist 71: political, social, economic, and cultural forces of the United States, from the earliest settlements to 1876. Hist 72: from 1876 to present. (Academic year)
- 101 **Special Topics** (3) Staff  
Historical perspectives on great issues of past and present. The topic each semester will be announced in the *Schedule of Classes*.
- 107 **The Ancient Near East and Egypt to 322 B.C.** (3) Hadley  
Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to Alexander's conquest.
- 108 **Greece and the Near East, 359 B.C. to the Second Century A.D.** (3) Hadley  
Survey of cultural, social, political, and economic developments in the Hellenistic world and societies of the Near East from the reign of Philip II to the height of Roman power and influence in these regions.
- 109 **Early Aegean and Greek Civilizations to 338 B.C.** (3) Hadley  
Neolithic background; Bronze Age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the Macedonian conquest. (Fall)
- 110 **The Roman World to 337 A.D.** (3) Hadley  
Prehistoric Italy; rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule. (Spring)
- 111-12 **Medieval History** (3-3) Andrews  
Hist 111: Failure of the old Roman Empire, formation of barbarian kingdoms in the West and their evolution to about 1000 A.D.; Byzantium and Islam at their apogee. Hist 112: Medieval European daily life, institutions, and creative movements to about 1400; the Crusades and the Near East to the rise of the Ottoman Turks. (Academic year)
- 116 **History of Africa** (3) Staff  
Survey of political, cultural, and economic development from ancient times to the present, with emphasis on the rise and demise of European colonialism. (Spring)
- 117 **Crisis or Conspiracy? A History of the International Politics of Oil** (3) Becker  
The history of the international politics of oil, with special attention to developing relationships between major oil companies and governments here and abroad. (Summer)
- 119 **China in the 20th Century: Reform and Revolution** (3) Johnson  
Origins, goals, substance, and significance of political, social, and intellectual upheavals in China from 1900 to the present. (Summer)
- 121 **The Renaissance in Western Europe** (3) Schwoerer  
Study of the economic, political, intellectual, and cultural acceleration in Western Europe, beginning in the Italian city-states and spreading to France, Germany, and England, in the 14th through 16th centuries. (Fall)
- 122 **The Reformation in Western Europe** (3) Herber  
Religious, political, and social consequences of the theological upheavals of the 16th century. (Spring)
- 123 **European Intellectual History I** (3) Kennedy  
Popular culture; religion and science in the 17th century; the Enlightenment; Voltaire, Hume, Rousseau, Montesquieu, Beccaria, Diderot, Condorcet on religion, history, nature, society, and politics; the intellectual origins of the French Revolution. (Fall, even years)



- 124 European Intellectual History II (3)** Kennedy  
Intellectual responses to the French Revolution; 19th-century historical approaches to society, religion, economics, biology, ethics, and psychoanalysis; Hegel, Comte, Marx, Darwin, Nietzsche, and Freud; the intellectual origins of Nazism; literary, artistic, and philosophical responses to World War I. (Spring, odd years)
- 125 Women in European History (3)** Schwoerer  
A study of the role of women in the political, social, intellectual, and economic life of Europe from the Middle Ages to the 20th century. (Spring)
- 128-29 War and Society (3-3)** Staff  
How wars, armed forces, and defense policies have affected British and American politics and society. Special attention to the relationship of defense and foreign policy, civil-military relations, the development of strategic thought, and the naval and military influence Britain and America have exerted on each other. Hist 128: 1776-1918. Hist 129: 1919-present. (Academic year)
- 131-32 History of Germany (3-3)** Herber  
Political, social, and cultural development. Hist 131: From mid-17th century to Bismarck. Hist 132: From William II to the present. (Academic year)
- 133 Recent U.S. History, 1890-1941 (3)** Ribuffo  
Political, social, diplomatic, and intellectual developments, with particular emphasis on the "searching" '20s and New Deal. (Fall)
- 134 Contemporary U.S. History Since 1941 (3)** Ribuffo  
Political, social, diplomatic, and intellectual developments, with particular emphasis on the Cold War, "silent" '50s, and disrupted '60s. (Spring)
- 136 Europe in the 20th Century (3)** Sachar  
Diplomatic, political, and cultural developments from the turn of the century to the present. (Spring)
- 137-38 History of American Foreign Policy Since World War II (3-3)** Thornton  
Emphasis on American and Soviet strategy and foreign policy in the era of the Cold War. Hist 137: World War II to the Vietnam War; Hist 138: Vietnam to the "New World Order." (Academic year)
- 139-40 World History in the 20th Century (3-3)** Sachar  
Diplomatic, political, and cultural factors. Hist 139: From the turn of the century to the Munich settlement of 1938. Hist 140: From the Munich settlement to the present. (Academic year)
- 141 History of France I (3)** Kennedy  
Old Regime: Louis XIV, demography, peasants, bourgeois, nobles; Church-Protestant-Jewish relations; salons, Enlightenment, and philosophes; literacy and education; Robespierre and Revolution; Napoleon. (Fall, odd years)
- 142 History of France II (3)** Kennedy  
The Revolutionary tradition and authoritarianism from the Restoration to De Gaulle; the events of 1848, socialism and the class struggle; women, marriage, morals, and population; industrialization and rural France; deChristianization, Catholic integralism, and worker priests; France's decline as a world power; its intellectual and artistic leadership. (Spring, even years)
- 145 Russia to 1801 (3)** Atkin  
Survey of Russian history from the rise of the Kievan confederation in the ninth century to the establishment of Imperial Russia as a European great power. Attention will be given to the political, socioeconomic, and cultural history of the East Slavs, especially the Russians. (Fall)
- 146 Russia Since 1801 (3)** Atkin  
Survey of Russian and Soviet history from the reign of Alexander I to the post-Stalin era. Attention will be given to the contending forces of revolution, reform, and conservatism; diplomatic relations; economic development; and social change. (Spring)
- 148 The French Revolution (3)** Kennedy  
Social, political, economic, and cultural history of the decade of revolution, 1789-1799. Attention to its structural consequences in France and in Europe at large. (Summer)
- 149-50 European Diplomatic History (3-3)** Staff  
Emphasis on policies and actions of the great powers and their statesmen. Issues of war and peace, international crises, nationalism, alliances, and tensions. Hist

- 149: 1812 to 1890. Hist 150: Since 1890. Students who receive credit for Hist 150 cannot receive credit for Hist 157. (Academic year)
- 151-52 **History of England (3-3)** Staff  
Development of English civilization and its impact on Western culture. Hist 151: To 1889. Hist 152: Since 1889. (Academic year)
- 153 **Tudor England (3)** Schwoerer  
Aspects of the constitutional, social, intellectual, economic, and religious development of England, 1485-1603. (Fall)
- 154 **Stuart England (3)** Schwoerer  
The civil wars, Restoration, and Glorious Revolution. Political, religious, socio-economic, and intellectual developments in England, 1603-1714. (Spring)
- 155 **History of Modern Ireland (3)** Staff  
The political and cultural development of Ireland since the Middle Ages and the continuing interaction between Ireland and England, with emphasis on the period from the Act of Union of 1801 to the Partition of 1923.
- 157 **20th-Century European Diplomatic History (3)** Sachar  
The main currents, with necessary 19th-century background. Prerequisite: Hist 40. Students who receive credit for Hist 157 cannot receive credit for Hist 150. (Fall)
- 158 **Modern Jewish History (3)** Sachar  
A secular history of the Jewish people from the 18th century to the present state of Israel; emphasis on European political, economic, and cultural influences. (Spring)
- 161 **Revolution in 20th-Century Latin America (3)** Klarén  
Examination of the major social revolutions in modern Latin America, especially in Mexico, Bolivia, Cuba, and Nicaragua; their origins, ideology, process, and outcomes. (Fall)
- 162 **20th-Century Latin America (3)** Klarén  
A survey of the main societal trends shaping Latin America in this century, with particular emphasis on such themes as populism, urbanization, reformism, modernization, nationalism, revolution, the military dictatorship, and the development process. (Spring)
- 163-64 **History of Latin America (3-3)** Klarén  
Hist 163: Analysis of Spanish and Portuguese imperialism in the New World, 1492-1820. Hist 164: A problems approach to Latin America, 1820 to the present; thematic emphasis on neocolonialism, corporatism, liberalism, caudillismo, modernization, populism, and revolution. (Academic year)
- 165 **Latin America and the Industrializing World, 1850-present (3)** Klarén  
Examination of the political/diplomatic responses of Latin American nations, individually and collectively, to the expanding industrial powers of the Northern hemisphere in the 19th and 20th centuries, particularly to the United States. (Fall)
- 167 **Themes in U.S. Cultural History (3)** Gillette, Mergen  
Same as AmCv 167.
- 169 **The American Revolution (3)** DePauw  
The political, intellectual, social, military, and economic impact of the events surrounding the separation of the United States from the British Empire. Special attention to the influence of non-elite groups. (Fall)
- 170 **U.S. Early National History (3)** Hill  
Political, diplomatic, economic, and social history of the early republic, 1787-1828. (Fall)
- 171-72 **U.S. Social History (3-3)** Horton  
Hist 171: Daily life, institutions, intellectual and artistic achievements of the agrarian era, 1607-1861. Hist 172: The urban-industrial era from 1861 to present. Same as AmCv 171-72. (Academic year)
- 173 **African-American History (3)** Horton  
Survey of the African-American experience, emphasizing the contributions of black Americans to and their impact upon American history. Same as AmCv 173. (Fall)
- 174 **Special Topics in African-American History (3)** Horton  
Concentration on specific issues central to the African-American experience. Consult Schedule of Classes for issues to be addressed. (Spring)



- 175 The Development of the American State (3)** Berkowitz  
The rise of the federal government as an influence over American life. Topics include the rise of regulatory government, the creation of a welfare state, and the development of macroeconomic management.
- 176 The Modern American Presidency (3)** Berkowitz  
The development of the modern American presidency, from Theodore Roosevelt to Ronald Reagan, examining the intersection of personal and impersonal forces in the creation of modern America.
- 177 The Jacksonian Era and the Rise of Mass Politics (3)** Horton  
The period 1828–1860 and its continuing significance to American society; emphasis on racial and gender divisions and changes in the legal and political systems. (Fall, alternate years)
- 179 U.S. Economic History (3)** Berkowitz  
Survey of American economic history from colonial times to the present. Particular attention is given to the economics of slavery, the development of a national industrial economy, and the growth of the federal government as an influence on economic policy. Same as Econ 179.
- 181–82 U.S. Diplomatic History (3–3)** Hill  
American foreign relations from the era of the American Revolution. Hist 181: to 1898. Hist 182: 20th century. (Academic year)
- 184 Civil War and Reconstruction (3)** DePauw  
How tensions between the sections developed into violence, how a total war was fought on American soil, and how the experience of war affected the generation that lived through it. (Spring, alternate years)
- 185 History of Women in America (3)** DePauw  
Survey of the political, economic, social, military, religious, intellectual, and cultural practices in North America from 1000 A.D. to the present as these have affected and been affected by the female half of the population. (Spring, alternate years)
- 186 U.S. Urban History (3)** Gillette, Stott  
The American city from colonial foundations to the present, relating social and economic forces to physical form. Special emphasis on transitions from pre-industrial to industrial to metropolitan forms, focusing on implications for public policy and historic preservation. Same as AmCv 186. (Fall)
- 187 History of Modern China (3)** Johnson  
China since 1840, with particular attention to political developments. (Fall)
- 188 History of Chinese Communism (3)** Thornton  
Survey of the leadership, ideology, structure, and foreign and domestic policies of the Chinese Communist Party from its inception to the present. (Fall)
- 189 History of Modern Japan (3)** Staff  
Japan's century of modernization—from the Meiji Restoration of 1868 to the present. Emphasis on historical, political, economic, and cultural factors. (Fall)
- 190 Ethnohistory (3)** Wagner, Humphrey  
Same as Anth 190.
- 191–92 Senior Honors Thesis (3–3)** Atkin  
Required of and open only to undergraduate honors candidates in history. (Academic year)
- 193 History of the Middle East (3)** Khoury  
Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states. (Fall)
- 194 History of the Modern Middle East (3)** Khoury  
Beginning with Napoleon's invasion of Egypt. Development of nationalism and of modern states; impact of the West on culture and institutions; great-power imperialism; crises of Turkish Straits, Suez, Arab–Israeli relations; and other issues. (Spring)
- 195 Traditional Civilizations of China and Japan (3)** Johnson  
Intellectual, institutional, and social development of the traditional civilizations of China and Japan, from their origins to 1800. (Fall)
- 196 The Modern Transformation of China and Japan (3)** Johnson  
The social, political, and intellectual transformation of China and Japan from the mid-19th century to the present. (Spring)

- 197 Oral History and Interview Techniques (3)** Staff  
Same as AmCv/Anth 197.
- 198 Proseminar: Readings for the History Major (3)** Staff  
Required of history majors; this course should be taken during the junior year. Readings and discussions on major trends in history; representative selections from the classics of historical literature. Students who receive credit for Hist 198 cannot receive credit for Hist 201. (Fall and spring)
- 199 Undergraduate Research Seminar (3)** Staff  
Required of senior history majors, history minors, and students taking history as a secondary field. Normally to be taken after completing Hist 198. (Spring and fall)

## HONORS

### University Honors Program Committee

D.A. Grier (Director), H.L. Agnew, H.F. Gillette, D.L. Jones, J. Liebowitz, A.C. Meltzer, L.C. Moersen, A. Romines, D.A. Rowley, M.J. Sodaro

Courses listed under Honors are open only to undergraduate students who have been admitted to the University Honors Program. Applications are sent to qualifying students when they apply to the University; freshmen who are interested in the program may have an opportunity to apply to join as sophomores. The program includes students from Columbian College, the Elliott School of International Affairs, the School of Business and Public Management, and the School of Engineering and Applied Science. Consult the *Schedule of Classes* for additional Honors courses.

In most instances applicable Honors courses may be substituted for program requirements; students should consult with their advisor to determine applicability.

- 23-24 Mathematical Theory of Languages (3-3)** Harizanov  
Language, information, meaning, truth, and paradox. Formal (artificial) versus natural languages. Chomsky's classification of languages and their recognition by conceptual machines. Mathematically formalizing fragments of natural language. Situation semantics, a recent complete theory of linguistic meaning.
- 33-34 Honors General Chemistry (4-4)** Rowley  
Equivalent to Chem 11-12, but with selected topics studied in greater depth. Additional topics covered may include environmental chemistry, biochemistry, or industrial chemistry. Laboratory fee, \$45 per semester. (Credit will be allowed for only one of the following sets of courses: Honr 33, Chem 11, Chem 17; Honr 34, Chem 12, Chem 18.)
- 36 Honors Introduction to Geology (3)** Tollo  
Introduction to fundamental principles of geology and the dynamic geologic processes that shape and modify the earth. Earth materials and processes, plate tectonics, environmental applications. Required field trips provide first hand experience in data acquisition, scientific interpretation, and modeling.
- 37 Social Impact of Computers (3)** Martin  
Social impact of computer technology, including personal and professional ethics, freedom and privacy, workplace issues, reliability of socially critical systems, computer crime, artificial intelligence, professional software tools. Research project using a large database.
- 43-44 Honors Introductory Economics (3-3)** Goldfarb, Yezer  
Honr 43: Introductory microeconomics, including market supply and demand, how price systems function, and philosophical issues. Honr 44: Introductory macroeconomics, including determination of national output, income, prices, and employment. Problems of forecasting and controlling economic variables. (Credit will not be given for both Honr 43 and Econ 11 or Honr 44 and Econ 12.)
- 53 Honors Topics in Music (3)** Younes  
An examination of varying topics linking music with other areas of the humanities.
- 63-64 Honors English (3-3)** Wallace, Soltan  
Major documents of British literature, contextualized in their own culture and in relation to other discourses. Questions of canon, authority, and historicity. Contemporary theoretical issues. Authors include Chaucer, Shakespeare, Milton, Wordsworth, Joyce. (Credit will not be given for both Honr 63 and Engl 51 or Honr 64 and Engl 52.)



- 71-72 Honors Western Society and Civilization (3-3)** Staff  
Central texts and major ideas of Western civilization. Honr 71 examines the Greek, Roman, Judaic, and Christian traditions through readings in classical epic, drama, history, scripture, philosophy, spiritual autobiography. Honr 72 examines key works from the Middle Ages, Renaissance, and Enlightenment. (Credit will not be given for both Honr 71 and Hmn 1 or Honr 72 and Hmn 2.)
- 74 Law, Philosophy, and Politics (3)** Altman  
Ethical dimensions of legal and political issues. Topics include the value of human life, social justice, individual rights and democracy.
- 81-82 Classical Greek Language and Culture (3-3)** Fisher  
Grammar, vocabulary, and structure of ancient Greek, coordinated with the reading of ancient authors in Greek (Aristophanes, Plato) and the study of topics in Greek culture and history.
- 81 Emerging Information Technologies (3)** J. Liebowitz and Staff  
The foundations and rapidly changing developments in selected information technologies. Concepts, methodologies, and applications of advancing information technologies. The course is team-taught in modules, with hands-on computer experience.
- 101 University Symposium (2 or 3)** Grier  
Independent study or project with weekly seminar exploring some aspect of the selected text(s) or topic(s) of the University Symposium. Open only to juniors and seniors.
- 113-14 Environmental History (3-3)** Mergen  
Survey of environmental issues, such as energy resources, food production, water and air quality, climate changes, and urban sanitation, during the past 500 years. Honr 113 focuses on the period before 1870; Honr 114 on 1870 to present.
- 115-16 Introduction to the History of Soviet Cinema (3-3)** Rollberg  
Introduction to the development of Soviet cinema from a political, social, and aesthetic point of view.
- 117 Political Polls and the Media (4)** Wiley  
Public opinion polling, its importance in the political process, and its use by politicians, governments, and mediating institutions. The role that the mass media play in assessing, communicating, and creating public opinion.
- 118 Environmental Health Psychology (3)** Jasnoski  
How some people react adversely to specific environments while others are impervious or actually thrive. Interaction between aspects of physical and social environments and psychological components to promote health and deter illness. Prerequisite: Psyc 1 or equivalent.
- 121-22 Nationalism in Eastern Europe (3-3)** Agnew  
Survey of the history of nationalism in Eastern Europe, based on primary sources, using the conceptual approaches of social sciences, and integrating regional with general European cultural trends. Honr 121: 18th and 19th centuries; Honr 122: 20th century.
- 123 State and Society in the Modern Middle East (3)** Khoury  
Study of the relationship between Middle Eastern governments and the societies they govern. Readings from several disciplines, literature, and primary sources.
- 142 Perspectives on the First World War (3)** Plotz and Spector  
This team-taught course examines World War I from a number of perspectives ranging from literature, psychology, and popular culture to military strategy and international relations theory.
- 191-92 Honors Internship (arr.)** Staff  
Fieldwork in chosen area of study. Open to juniors and seniors by permission; arrangements must be made with a sponsoring faculty member from the major department.
- 193-94 Independent Study or Research (arr.)** Staff  
Opportunity for work on individual or experimental projects. Open to juniors and seniors by permission; arrangements must be made with a sponsoring faculty member from the major department.
- 195-96 Senior Honors Thesis (arr.)** Staff  
Directed research project. Open to seniors by permission; arrangements must be made with a sponsoring faculty member from the major department.

## HUMAN SERVICES

Professors E.W. Kelly, Jr., J.C. Heddeshimer, D.W. Dew (Research), C.H. Hoare (Chair)  
 Adjunct Associate Professor B.B. Cuje  
 Assistant Professors H.W. Nashman, J. Garcia  
 Instructor T. Martin  
 Lecturer S.A. Straw

See the School of Education and Human Development for the program of study leading to the degree of Bachelor of Human Services.

## COUNSELING

- 162 **Foundations of Counseling** (3) Heddeshimer, Kelly  
 Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. (Fall, spring, and summer)  
 163 **Personal and Social Adjustment** (3) Hoare  
 Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Spring)

## HUMAN RESOURCE DEVELOPMENT

- 178 **Designing and Implementing Conferences and Meetings** (3) Staff  
 Same as TrSt 178. Use of design committees, steering committees, selection of resource people, site selection, exhibits, and relation to supplier personnel. Special attention to designing the core of the conference and related conference activities. (Spring and summer)

## HUMAN SERVICES

- 75 **Introduction to Rehabilitation** (3) Linkowski, Garcia  
 Overview of rehabilitation profession, including philosophy, history, ethics, legislation, settings, and practice. (Fall)  
 133 **Supervised Experience in Human Services** (3 to 6) Nashman  
 Fieldwork, internship, and instructional practice. Admission by permission of instructor. (Fall and spring)  
 171 **Introduction to Human Development I** (3) Hoare  
 Lectures and fieldwork. All aspects of development through adolescence; child study techniques. Two to three hours weekly field experience in appropriate setting. (Fall)  
 172 **Introduction to Human Development II** (3) Hoare  
 Adult development from young adulthood to old age. Dominant psychological, social, and physical competencies; motivational changes; coping styles; maladaptive behavior. Three hours weekly field experience in appropriate agency setting. (Spring)  
 176 **Program Planning and Development for Service Agencies** (3) Ferrante, Hoare  
 Examination of program planning and development activities essential to human service agencies. Through case studies and on-site field experiences, students examine and analyze a variety of processes in which agency needs are assessed and programs planned. (Spring)  
 178 **Psychosocial Aspects of Disabilities** (3) Linkowski  
 Impact of disabilities and concepts of normalization. (Fall)  
 181 **Medical Aspects of Disabilities** (3) Garcia  
 Chronic and traumatic disorders with rehabilitation implications. (Fall)  
 182 **Organization and Administration in the Human Services** (3) Nashman and Staff  
 Introduction to organizational theory and program administration in non-school agencies, staff recruitment and development, fiscal operations, personnel and program supervision, facilities, and maintenance of affective community relations. (Spring)



- 193-94 **Research and Independent Study** (arr.) Hoare, Nashman  
Individual research under guidance of a staff member. (Academic year)
- 195 **Seminar in Human Services: Current Issues** (3) Nashman and Staff  
Analysis of selected issues in human services. Each student conducts an investigation of an identified problem in human services and completes a skill assessment project. Admission by permission of instructor. (Spring)
- 200 **Special Workshop** (arr.) Hoare  
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.

## HUMANITIES

### Humanities Steering Committee

M. Dow (Coordinator), J. Anderson, J. Chaves, R.P. Churchill, E.A. Fisher, D. Grier, R.E. Kennedy, E. Marder, B. Maxwell, C. Sponsler, R. Steinhardt, M. Ticktin, D.D. Wallace, G. Weiss, L. Youens

Columbian College and Graduate School of Arts and Sciences offers a set of interdisciplinary courses designed to provide a coherent introduction to classic works in the humanities. The courses deal with historical figures, creative works of art and literature, systems of philosophy, and religious traditions that are the common property of educated people. The full interpretation of these fundamental sources of Western culture requires the collaboration of faculty from all disciplines of study encompassed in the humanities.

- 1 **Roots of the Western Tradition** (3) Staff  
Basic ideas of Western thought from early Greek, Roman, Judaic, and Christian traditions. Representative readings in drama, epic, historical writings, oratory, creation stories, scriptural traditions, philosophy, and spiritual autobiography. Some sections are taken in conjunction with Engl 13. (Fall and spring)
- 2 **Ideas in Western Culture: Aquinas to Locke** (3) Staff  
An examination in historical context of central texts from the Middle Ages, the Renaissance, and the Enlightenment: Aquinas, Dante, Machiavelli, Erasmus, Luther, Montaigne, Bacon, Shakespeare, Rabelais, Descartes, Milton, and Locke. (Fall and spring)
- 4 **Romanticism and Revolution: The 19th Century** (3) Guenther  
Major themes of 19th-century culture from 1789 to 1900 in representative works of European and American art, literature, music, drama, philosophy, and theology. The 19th-century resources of Washington—museums, monuments, collections, concerts, plays—form part of the curriculum.
- 5 **The 20th-Century Consciousness** (3) Soltan  
Major themes and paradigms of 20th-century civilization as expressed in key literary and philosophic texts, visual arts, music, and cultural artifacts. Key issues include the meaning of history in the age of two world wars; the Holocaust and the crisis of reason; the authority of science; the decline of Western hegemony; modernism and postmodernism. (Spring)
- 6 **Asian Humanities** (3) Chaves, Hildebeitel, Kim-Renaud, Srinivasan  
The traditional art and literature of the cultures of South Asia (India, Pakistan, Sri Lanka, Tibet) and East Asia (China, Korea, Japan). Attention to religious and philosophical systems as well as to continuities and changes in modern Asian culture. (Fall)
- 7 **African Humanities** (3) Dow, Brooks, and Staff  
An introduction to the literature, art, and philosophy of the African continent in historical, cultural, and geographic contexts. Overview of sculpture, rock painting, and architecture; the oral tradition and modern literature; traditional philosophies and religions. The roles of Islam and Christianity in Africa.

## INTERNATIONAL AFFAIRS

Professors W.H. Becker, E. Berkowitz, B.L. Boulter, M.D. Bradley, J. Chaves, J.J. Cordes, R.M. Dunn, Jr., M.A. East, J.A. Frey, F. Ghadar, O. Havrylyshyn, J. Henig, P.P. Hill, M.A. Holman, C.C. Joyner, R.E. Kennedy, Jr., Y. Kim, P.F. Klarén, J.E. Kwoka, Jr., P. Lauter, W.H. Lewis, C.A. Linden, J.M. Logsdon, J.C. Lowe, J. Manheim, C. McClintock, J. Millar,

J.A. Morgan, Jr., C.A. Moser, H.R. Nau, J. Pelzman, J.M. Post, P. Reddaway, B. Reich, L.P. Ribuffo, H.M. Sachar, B.M. Sapin, C.W. Shih, G. Sigur, M. Sodaro, H. Solomon, R.H. Spector, R. Thornton, D.E. Vermeer, S. Wolchik, A.M. Yezer

Adjunct Professors T.F. Carroll, J. Hardt, R.D.F. Palmer, E.L. Warner

Associate Professors H.L. Agnew, C.J. Allen, M.A. Atkin, N.J. Brown, C.J. Deering, C.F. Elliott, H.B. Feigenbaum, C.J. Herber, W.R. Johnson, Y.K. Kim-Renaud, J. Kuipers, J.H. Lebovic, D.L. Lee, G. Ludlow, Y. Olkhovsky, F. Robles, R.W. Rycroft, S.C. Smith, P. Steinhardt, R.Y. Yin

Adjunct Associate Professor R.R. Garcia

Assistant Professors M. Finnemore, D. Hart, M.D. Moore, S. Suranovic, N.S. Vonortas, G.C.Y. Wang

The Elliott School of International Affairs offers a multidisciplinary program leading to the degree of Bachelor of Arts in the field of international affairs. The program provides students with a broad background in the general areas of international affairs as well as a solid liberal arts education focusing on an understanding of major historical and contemporary issues in international affairs.

*Bachelor of Arts with a major in international affairs*—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.  
2. Prerequisite courses—see the Elliott School of International Affairs, Curriculum Requirements.

3. Required courses for the major—Econ 181–82; a foreign language through the third-year level; one course selected from Geog 120, 127, 132, 133, 134, 135, 145, 146, 147, 154, 161, 164; Hist 182 and one course selected from Hist 136, 150, 157; PSc 140 and either PSc 142 or 144. Also required are two non-Western cultural courses, such as IAff 90 or 91. This requirement can also be met with certain 100-level courses listed below under Regional Study for Africa, East Asia, Latin America, or the Middle East. Some courses offered under IAff and other departments are also acceptable. Students must take a research methods course to be chosen from among Anth 199, PSc 101 or 104, Soc 140, Stat 51 or 53 or 111.

4. Fifteen credit hours of additional course work must be selected from one of the following group options (courses taken in fulfillment of required courses for the major may not be applied to the selected group option).

*International politics*—courses concerned with theory and practice in international affairs, forces shaping the world scene, and U.S. foreign policy, selected from Geog 120, 127, 133, 146, 147; Hist 137–38, 139–40, 149; IAff 152, 195; PSc 105, 106, 107, 108, 130, 131, 142, 144, 146, 149, 161, 175, 178, 182, 183, 184, or 192.

*International economics*—courses concerned with the world economy and U.S. policy and practice in international trade and finance, selected from IBus 160, 166, 173; Econ 101, 102, 104, 121, 122, 130, 134, 151; Geog 125, 127, 132, 133, 134, 135; Stat 111, 112.

*International communications*—courses concerned with the study of international information programs, public opinion, psychological warfare, cultural relations, and public relations, selected from Anth 4, 150, 153, 157, 161, 162; Comm 184, 185; Geog 125; IAff 152; Jour 145, 146; Jour/PSc 128; PCm 100, 150; PSc 120, 129, 146; Psyc 102, 156.

*Regional study*—a concentration in one of the following areas.

*Africa*—courses selected from Anth 178; Geog 154, 164; Hist 116; IAff 93; PSc 180, 181, 182.

*Europe*—courses selected from Art 31, 32, 109, 110, 129, 169; Engl 51–52; Ger 51–52, 103, 104, 114, 126; Hist 128–29, 131–32, 141–42, 148, 149, 150, 151–52, 158; Hmn 1–2, 4; Mus 101, 102, 103, 104; Phil 71, 112, 113; PSc 105–106, 130, 131, 161.

*East Asia*—courses selected from Anth 173, 175; Art 120; Chin 163–64, 179–80; Econ 169, 170, 171; Geog 266; Hist 119, 187, 188, 189, 195, 196; Japn 111–12; PSc 170, 173, 175; Rel 2, 160.

*Latin America*—courses selected from Anth 170, 172, 185, 186; Econ 185; Geog 161; Hist 161, 162, 163–64, 165; IAff 90, 190; PSc 183, 184.

*Middle East*—courses selected from Anth 177; Art 116; Clas 100, 101, 102; Geog 154; Hist 158, 193, 194; PSc 176, 177, 178, 179, 180; Rel 23, 161, 163, 164, 165.

*Russia and Eastern Europe*—courses selected from Econ 133, 134; Geog 285; Hist 137–38, 145, 146, 188; IAff 92; PSc 108, 131, 168; Slav 71, 161–62, 165, 166.

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of their program.



With permission, a limited number of graduate courses may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

The following courses carry the International Affairs (IAff) designation. All other courses listed above will be found under the appropriate department designation.

**Note:** International affairs courses numbered in the 90s may be cross-listed by other departments, often under Special Topics courses; see the *Schedule of Classes*.

- 90 **Latin America: Problems and Promise** (3) Klarén and Associated Faculty  
An interdisciplinary course in Latin American studies designed to introduce undergraduates to the diverse, rich, and complex history, politics, economy, culture, and society of Latin America.
- 91 **East Asia—Past and Present** (3) Johnson and Associated Faculty  
An interdisciplinary course offering a comprehensive and integrated introduction to the civilization and present problems of East Asia.
- 92 **Russia and Eastern Europe: An Introduction** (3) Reddaway, Wolchik  
A multidisciplinary introduction to the lands and cultures of the former Soviet Union and Central and Eastern Europe. The main emphasis is on history and politics, with attention also given to economics, trade, geography, military matters, literature, and the media.
- 93 **Africa: Problems and Prospects** (3) Staff  
Aspects of the environment, culture, and politics as they affect the present and anticipated future of Africa.
- 152 **Foreign Policy in the Information Age** (3) Roberts  
Diplomacy in the information age; the role of communications in government-to-government relations as well as the expanding scope of government-to-people interactions, including the roles of spokesmen, the Voice of America, and the Fulbright program.
- 156 **InterFuture: Independent Study Abroad** (15) Staff  
Comparative research in the United States and one or two other countries included in the InterFuture program. InterFuture scholars are selected on the basis of academic record and aptitude for independent research in a foreign environment. Enrollment limited to juniors in the Elliott School.
- 190 **Special Topics** (3) Staff  
Courses designed to focus on international affairs issues of a more current or topical nature. Topics announced in the *Schedule of Classes*.
- 195 **Internship** (0 to 6) Staff  
Internships in the Department of State, Organization of American States, and other agencies concerned with international affairs. Admission by permission of instructor. If the internship is taken for no credit, a \$25 administrative fee is charged.
- 198 **Independent Study and Research** (1 to 3) Staff  
Upper-division students only. Written permission of instructor required.

## INTERNATIONAL BUSINESS

Professors P.D. Grub, G.P. Lauter, R. Eldridge, F. Ghadar (Chair), Y.S. Park, H.G. Askari  
Associate Professor F. Robles  
Assistant Professors K. Visudtibhan, M.L. Egan, S.S. Rehman

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

- 160 **Introduction to International Business** (3) Grub, Visudtibhan  
Social, cultural, political, legal, and technological environment of multinational business, emphasizing host-government/multinational corporation interface. Terminology, trade uses and practices, conditions essential for successful business operations; physical movement of goods in international business. Prerequisite: Econ 11–12. (Spring)
- 166 **International Marketing Management** (3) Robles, Egan  
Scope of international markets; factors in assessing world marketing opportunities; international marketing product, pricing, distribution, and promotion program development in dynamic world markets and global environment. Prerequisite: MLOM 140. (Fall and spring)

- 168 Foreign Market Analysis (3)** Robles, Grub  
Patterns of world trade by country, commodities, and products; selected regional analyses, in-depth market studies. Prerequisite: IBus 160, 166. (Spring)
- 171 International Business Finance (3)** Eldridge, Askari, Rehman  
Analysis of the international economic environment and its influence on corporate financial management of international operations. Prerequisite: Fina 120. (Fall and spring)
- 173 International Banking (3)** Park, Ghadar, Rehman  
Theory and practice of international banking; analysis of international commercial and investment banking from a management perspective; subjects include current international monetary and financial environment, money and capital markets, and topical problems of international banking from a management perspective. Prerequisite: IBus 171. (Fall and spring)
- 175 International Monetary and Financial Issues (3)** Eldridge, Askari, Rehman  
International macro and micro issues of money, banking, and finance examined from a management perspective. Topics include international monetary systems, Eurocurrency markets, LDC debt crises, role of the IMF and the World Bank, and development banking issues. Prerequisite: IBus 171 or permission of instructor. (Fall)
- 190 Special Topics (3)** Staff  
Experimental offering: new course topics and teaching methods.
- 199 Individual Research (arr.)**  
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

## ITALIAN

See Romance Languages and Literatures.

## JAPANESE

See East Asian Languages and Literatures.

## JOURNALISM

See Communication Studies.

## JUDAIC STUDIES

### Committee on Judaic Studies

M. Ticktin (Chair), R. Elsen, M. King, R. Krulfeld, Y. Moses, J.A. Plotz, B. Reich, H.M. Sachar, H.E. Yeide, Jr.

Columbian College and Graduate School of Arts and Sciences offers an interdisciplinary program in Judaic studies leading to the degree of Bachelor of Arts. This program is intended for students who wish to investigate the history, language, literature, religious and philosophical thought, and political and social experience of the Jewish people from the perspective of several academic disciplines. (Students who wish to concentrate on the religious aspects of Judaism and its relationship to the other religious traditions of the world may prefer to elect a major in religion with an emphasis on Judaism [see Religion].)

**Bachelor of Arts with a major in Judaic studies**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Clas 21–22, 23–24; Rel 9, 23.
3. Required courses for the major (24 credit hours):
  - (a) Clas 103 or 104; Hist 158; PSc 176 or 179; Rel 107 and either Rel 291 or 292.
  - (b) Three courses selected from the list below; substitutions are permitted with the approval of an advisor designated by the Committee on Judaic Studies.

**Minor in Judaic studies**—Required: Clas 21–22 and a minimum of 12 credit hours, chosen in consultation with an advisor designated by the Committee on Judaic Studies,



from Clas 23-24, 25-26, 100, 101, 102, 103, 104; Hist 158, 292; PSc 176, 179; Rel 9, 23, 103, 107, 112, 113, 114, 115, 116, 123, 134, 174, 209, 213, 238.

The courses listed below pertain to Judaic studies. See the Graduate Programs Bulletin for courses at the 200 level.

- Clas 21-22 *Beginning Hebrew*
- Clas 23-24 *Intermediate Hebrew*
- Clas 25-26 *Yiddish for Reading and Conversation*
- Clas 100 *Modern Hebrew Literary Classics*
- Clas 101 *Israeli Society and Culture: Literary Perspectives*
- Clas 102 *Contemporary Israeli Short Stories and Poetry*
- Clas 103 *Modern Hebrew Nonfiction*
- Clas 104 *Modern Hebrew Fiction*
- Clas 120-21 *Advanced Hebrew Literature*
- Clas 185-86 *Directed Reading*
- Hist 158 *Modern Jewish History*
- Hist 292 *Israel, Zionism, and the Arab World*
- PSc 176 *The Arab-Israeli Conflict*
- PSc 179 *Israeli Politics and Foreign Policy*
- Rel 9 *The Hebrew Scriptures*
- Rel 23 *Introduction to Judaism*
- Rel 103 *The Prophets*
- Rel 107 *Rabbinic Thought and Literature*
- Rel 112 *Jewish Mysticism*
- Rel 113 *Early Post-Biblical Judaism*
- Rel 115 *Jewish Philosophy in the Medieval Period*
- Rel 116 *Judaism After Emancipation*
- Rel 123 *Issues in Jewish Ethics*
- Rel 134 *The Holocaust in Theology and Literature*
- Rel 174 *American Judaism*
- Rel 209 *Seminar: Biblical Studies*
- Rel 213 *Seminar: Judaism in Late Antiquity*
- Rel 238 *Seminar: Topics in Jewish Thought*

## KOREAN

See *East Asian Languages and Literatures*.

## LATIN

See *Classics*.

## LATIN AMERICAN STUDIES

**Program Committee:** P.F. Klarén (Director), C.J. Allen, Y. Captain-Hidalgo, C. McClintock, M. Price, J. Quiroga, R. Valero, I. Vergara, B. von Barghahn

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in Latin American studies.

*Bachelor of Arts with a major in Latin American studies*—The following requirements must be fulfilled.

1. The general requirements stated under the Elliott School of International Affairs.
2. Prerequisite courses—see the Elliott School of International Affairs, Curriculum Requirements.
3. Required courses for the major—Anth 172 or 185, 190, or 192; Econ 185; Geog 161; Hist 163-64; LAff 90, 287; PSc 183, 184; Span 1, 2, 3, 4, 8 or 9, 10, 55, 56, or other approved courses in Spanish-American literature.
4. Twelve credit hours of additional course work must be taken in one of the following departments: Anthropology, Economics, Geography and Regional Science, History, Political Science, and Romance Languages and Literatures (courses in Hispanic literature).

5. Students who plan to apply for graduation with Special Honors must take a research course in the field of concentration and complete an independent study project with distinction.

The following courses pertain to Latin American studies.

Anth/Geog 115	Meso-American Field Program
Anth 170	Cultures of the Caribbean
Anth 172	Cultures of South America
Anth 185	Archaeology of Meso-America
Anth 186	Archaeology of South America
Anth 190	Ethnohistory
Anth 192	Development Anthropology
Art 147	Primitive Art I: Ancient Civilizations of Mexico and Latin America
Econ 185	Economic History and Problems of Latin America
Geog 161	Geography of Latin America
Hist 162	20th-Century Latin America
Hist 163-64	History of Latin America
IAff 90	Latin America: Problems and Promise
IAff 287	Problems in Latin American Civilization
PSc 183	Governments and Politics of Latin America
PSc 184	International Relations of Latin America
Span 55	History of Spanish-American Literature from the Conquest Through Romanticism
Span 56	History of Spanish-American Literature from Modernism to the Present
Span 133	Special Topics in Spanish and Spanish-American Literature
Span 147	Spanish-American Polemics
Span 148	New Narrative

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

## LIBERAL ARTS

Advisor J. Ziolkowski

**Bachelor of Arts: Program in the Liberal Arts**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. **Writing**—6 credit hours selected from Engl 9 or 10, 11 or 13, 101, 111, and/or creative writing courses.

3. **Quantitative and/or Logical Reasoning**—at least 6 credit hours, chosen from the combinations of courses specified under this General Curriculum requirement or from more advanced mathematics or statistics courses if prerequisites have been met.

4. **Conceptual Foundations and Development of Natural Sciences**—12-16 credit hours (two 6-8 hour sequences), chosen from the combinations of courses specified under this General Curriculum requirement. One sequence must be in Group A (biology or geology) and one in Group B (chemistry and physics).

5. **Social and Behavioral Sciences**—12 credit hours are required; 6 hours of paired course sequences (as indicated) must be chosen from each of the following two groups:

(a) Econ 11-12 or PSc 1 and 2 or 3-4;

(b) Two courses chosen from Anth 2, 3, and 4; Anth 2 and 150; Geog 1 and 2; Psc 1 and 8; Soc 1 and 2.

6. **The Arts**—6 credit hours, of which 3 hours must be chosen from courses specified under the General Curriculum requirement in Creative and Performing Arts. Three additional hours must be chosen from the following: any art history course (except Art 119, 162, and 173 through 198); Comm 126, 143, 144; Mus 3, 4, 7, 8, 101-2, 103-4, 109, 110, 121; or TrDa 45, 46, 145-46, 151, 152, 153, 190, 191. Engl 81 may count toward either this requirement or the Writing requirement but not both.

7. **Literature**—12 credit hours, of which 6 hours must be chosen from the combinations of courses specified under the General Curriculum requirement. Six additional hours must



be chosen from literature courses offered by the Classics, East Asian Languages and Literatures, English, German, Romance Languages and Literatures, or Slavic Languages and Literatures Departments, or offered through the Honors program.

8. *Western Society and Civilization*—12 credit hours are required; 6 hours of paired course sequences (as indicated) must be chosen from each of the following two groups:

(a) Hist 39–40 or 71–72; if those courses have been waived, second-group courses in the History Department (except Hist 191–92 and 197) may be selected;

(b) AmCv 71–72; Art 31–32; Clas 71–72; Honr 71–72; Hmn 1–2; Hmn 4–5; Phil 51–52; Rel 1, 2. Art 31–32 may count toward either the Arts or the Western Society and Civilization requirement, but not both.

9. *Foreign Language*—6 credit hours in a foreign language beyond the second-year sequence.

10. A minimum of 36 credit hours must be taken in approved 100-level liberal arts courses (with a grade of C– or better).

Because this program allows considerable flexibility, a student should consult the advisor frequently to ensure that requirements are being addressed and that the planned program best meets the student's evolving interests and needs. The major in Liberal Arts may be combined with a second major. See Interdisciplinary Programs under Columbian College and Graduate School of Arts and Sciences for a general description of this program.

## LINGUISTICS

### Committee on Linguistics

R.M. Robin (Chair), I. Azar, Y.-K. Kim-Renaud, J. Kuipers, C.W. Linebaugh, C. Sponsler, I. Thompson

Columbian College and Graduate School of Arts and Sciences offers an interdepartmental program in linguistics. The purpose of the program is to provide a systematic treatment of the central issues in linguistics through courses taught under the auspices of the program and through other departments in Columbian College.

*Minor in linguistics*—15 credit hours of courses in linguistics, including Ling 101 and one course from each of the following groups. Applied Linguistics—Anth 168, 169; Chin 123–24; SpHr 118. Biological Foundations of Language—SpHr 102, 103, 120. Sociolinguistics and Historical Linguistics—Anth 161, 162; Engl 115; Phil 194. Academic advising about the minor in linguistics is available from any member of the Committee on Linguistics.

#### 101 Introduction to Language and Linguistics (3)

Staff

Development of a fundamental understanding of the nature of language and its components, including phonology, morphology, syntax, semantics, and pragmatics. Discussion of major approaches, principles, and concerns in the field of linguistics. (Spring)

## MANAGEMENT SCIENCE

Professors P.B. Vaill, J.B. Harvey, W.E. Halal, E.H. Forman, S.A. Umpleby, J.F. Lobuts, Jr., J.D. Frame, E.K. Winslow (Chair), J.H. Carson, N.M. Loeser (Emeritus), B. Burdetsky, P.W. Wirtz, J. Liebowitz

Associate Professors J.P. Coyne, L.E. Graff, T.J. Nagy, W.G. Wells, Jr., R.G. Donnelly, R. Soyer, P.B. Malone III, C.N. Toftoy, P.M. Swiercz, D.J. Cohen, P.P. Sanchez

Assistant Professors M. Granger, J. Artz

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

#### 58 Information Systems for Managers (3)

Granger

Technology, applications, and trends of business information systems. Hands-on experience in developing and/or using management information systems, database management systems, executive information systems, decision support systems, expert systems, and structured programming. Integration of information systems into an organization. (Fall, spring, and summer)

- 107 Fundamentals of Behavioral Science (3)** Lobuts, Winslow  
Survey of behavioral science research and practice as related to management. Emphasis on the basic human processes that contribute to the functioning of organizations. (Fall and spring)
- 110 Human Resources Management (3)** Burdetsky, Cohen, Swiercz  
The labor force and labor markets. The legal environment of human resource management. Human resource planning; employee recruiting, selection, training, development, compensation, motivation, discipline, health and safety. Unionism and collective bargaining. (Fall and spring)
- 115 Leadership in Human Resources (3)** Burdetsky, Toftoy, Cohen  
A study of the philosophy, principles, policies, and programs for effective personnel management and industrial relations as portrayed by case studies drawn from business and government. Prerequisite: Mgt 110. (Fall)
- 117 Collective Bargaining (3)** Burdetsky, Toftoy, Swiercz  
American unionism and collective bargaining; economic, social, and public policy considerations. The negotiation and administration of collective bargaining agreements. Prerequisite: Mgt 110. (Spring)
- 119 Computer Programming and Data Structures (3)** Coyne, Wirtz  
For students already familiar with basic computer concepts and programming, who will learn a programming language, such as C, Pascal, or COBOL, useful for business applications. Emphasis on computer applications in accounting and management information systems through hands-on programming. Prerequisite: Mgt 58. (Fall and spring)
- 120 Structured Development with CASE (3)** Granger, Carson, Coyne  
Analysis, design, and implementation of management information systems (MIS). Structured methodologies and techniques for various stages of the MIS development process. Computer-aided software engineering tools. May be taken for graduate credit with permission of program director and instructor. Prerequisite: Mgt 119 or permission of instructor. (Fall)
- 121 Expert Database Systems (3)** Granger, Coyne, Carson  
Theory, architecture, and implementation of database management systems in corporate and organization information systems. Fundamental concepts of database management and processing. Expert database systems. Hands-on experience with database management packages. Prerequisite: Mgt 119 or permission of instructor. (Spring)
- 122 Applied Artificial Intelligence (3)** Nagy, Liebowitz  
Students use artificial intelligence software to learn knowledge representation and manipulation of knowledge and to develop business systems. Prerequisite: Mgt 120 or 121 or permission of instructor. (Spring)
- 190 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 199 Individual Research (3)** Staff  
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall, spring, and summer)

## MARKETING, LOGISTICS, AND OPERATIONS MANAGEMENT

Professors S.F. Divita (Chair), R.F. Dyer, S.N. Sherman, J.H. Perry  
Associate Professors M.L. Liebrez-Himes, L.M. Maddox, P.K. Bagchi, P.A. Rau, R.S. Achrol  
Assistant Professors S.S. Hassan, L.N. Birou

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

### 140 Basic Marketing Management (3)

Role of marketing in the socioeconomic system, consumer behavior analysis, impact of consumerism. Major decision areas of product planning, pricing, and distribution; tools of marketing research and demand analysis. Prerequisite: Econ 11-12, Stat 51. (Fall and spring)

Achrol, Maddox, Hassan, Liebrez-Himes, Rau



- 142 Consumer Behavior (3)** Dyer, Hassan  
Social, cultural, and psychological factors influencing the behavior of consumers. Models of buyer behavior, consumption patterns, market segmentation, attitude formation and change, brand loyalty, adoption of innovations, and store choice decisions. Marketing management and public policy implications of consumer research. Prerequisite: MLOM 140. (Fall and spring)
- 143 Marketing Research (3)** Dyer, Rau  
Basic methods and techniques of market research. Designing a marketing research project: research questions, secondary and syndicated data, primary data collection approaches, data analysis and report presentation. Focus group interviews, questionnaire construction, statistical software packages. Prerequisite: MLOM 140, Stat 51, Mgt 58. (Fall and spring)
- 148 Advertising (3)** Maddox  
Planning an advertising campaign. Consumer and market information, message appeals, media selection and scheduling, measuring effectiveness. Current criticism and regulation of the advertising function. Other major marketing communication tools, including personal selling and sales promotion. Students taking this course in the spring must register concurrently for MLOM 149. Prerequisite: MLOM 140, 142. (Fall and spring)
- 149 Advanced Advertising Campaigns (3)** Maddox  
An application of the principles of marketing and advertising to the development of an advertising campaign. Students perform such tasks as situation analysis, market segmentation, marketing research, media selection, and copywriting in the preparation of the advertising campaign. Prerequisite: MLOM 143 or permission of instructor; prerequisite or concurrent registration: MLOM 148. (Spring)
- 150 Salesmanship and Sales Management (3)** Staff  
Development of personal selling and presentation skills; examination of types of selling situations. Organization of sales department, sales planning and forecasting, quotas, territories, performance standards, and analysis and control of distribution costs. Prerequisite: MLOM 140. (Fall and spring)
- 152 Retailing Management (3)** Staff  
A study of retailing management and strategy covering the current environment of retailing, retail market and financial analysis, store location and design, inventory management, and non-store and service retailing. Industry executive and student presentations and case analyses. Prerequisite: MLOM 140. (Fall)
- 159 Marketing: Strategic Planning (3)** Dyer, Liebrez-Himes, Rau  
The capstone seminar for marketing majors. Analytical integration of material covered in previous marketing courses. Marketing strategy literature, financial dimensions of marketing decisions, and comprehensive cases. Prerequisite: MLOM 142, 143, 150, and one additional marketing major field course. (Fall and spring)
- 188 Managing Production/Operations (3)** Bagchi, Perry, Ghosh  
Production planning concepts and analytical tools. Designing and managing production processes (facilities, equipment, process control systems). Design issues, demand forecasting, material planning, acquisition techniques. Managing the factory floor: scheduling, total quality management, continuous improvement concepts and methods. Prerequisite: Stat 51. (Fall and spring)
- 190 Special Topics (3)** Staff  
Experimental offering: new course topics and teaching methods.
- 199 Individual Research (arr.)**  
Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

## MATHEMATICS

Professors I. Katz (Chair), H.D. Junghenn, I.I. Glick, M.M. Gupta  
Adjunct Professor J. Eftis

Professorial Lecturers Y. Akiyama, E. Vegh

Associate Professors M.P. Lee, E.A. Stone, E.A. Robinson, R. Simion, F.E. Baginski, D.H. Ullman

Assistant Professors V. Harizanov, K.G. Hockett, J. Bonin, N. Taghavi, M. Moses, Y. Rong  
Assistant Professorial Lecturer A.I. Penn

**Bachelor of Arts or Bachelor of Science with a major in mathematics**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Math 31, 32, 33, 124.
3. Required courses in the major—a minimum of 24 additional credit hours of approved 100-level courses in mathematics, including Math 106, 121, 123, 139, and 140. It is recommended that students take French, German, or Russian, and mathematically related courses in such subjects as physics, statistics, economics, and engineering.
4. Undergraduates who want honors status should contact a department advisor for a specific program. Such status may be requested as early as completion of Math 32.

**Bachelor of Arts or Bachelor of Science with a major in applied mathematics**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite courses—Math 31, 32, 33, 124.
3. Required courses in the major—a minimum of 24 additional credit hours of approved 100-level courses in mathematics, including Math 111, 112, 139, 140, and 181. It is recommended that students take French, German, or Russian.
4. Required courses in a related area—12 additional credit hours, to be selected in consultation with the departmental advisor, from a related area such as economics, statistics, engineering, physics, biology, or computer science. At least 6 of these credit hours must be chosen from courses numbered 101 or higher. Students choosing to take the 12 hours in engineering or computer science are allowed a maximum of 12 hours outside of Columbian College; this is a permitted exception to the College's rule that limits professional courses to 9 hours.
5. Undergraduates who want honors status should contact a department advisor for a specific program. Such status may be requested as early as completion of Math 32.

**Minor in mathematics**—Requirements: a minimum of 18 credit hours in mathematics courses, of which at least 9 hours must be at the 100 level or higher, chosen in consultation with a departmental advisor.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** New students should take the mathematics placement examination before registering.

- |    |   |                 |
|----|---|-----------------|
| 3  | <b>College Algebra</b> (3)  | Gupta and Staff |
|    | Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. (Fall and spring)  |                 |
| 6  | <b>Plane Trigonometry</b> (3)   | Gupta and Staff |
|    | Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3. (Fall and spring)   |                 |
| 9  | <b>General Mathematics I</b> (3)  | Katz and Staff  |
|    | Prime numbers, the fundamental theorem of arithmetic, rational and irrational numbers, types of numbers, geometric constructions, infinite sets. (Fall and spring)  |                 |
| 10 | <b>General Mathematics II</b> (3)   | Katz and Staff  |
|    | The highway inspector and salesman problems, chance, the fifteen puzzle and ramifications, map coloring, tiling. (Fall and spring)  |                 |
| 12 | <b>General Mathematics with Computers I</b> (3)   | Staff           |
|    | Sets; logic; vectors and matrices. Functions and graphing instruction is accompanied by microcomputer practice, using the APL programming language. Primarily for nonscience majors. No computer experience needed. This course is an alternative to Math 9. (Fall) |                 |
| 13 | <b>General Mathematics with Computers II</b> (3)  | Staff           |
|    | Introduction to the basic concepts of calculus. Elements of probability theory. Elements of trigonometry. Topics are presented with microcomputer accompani-  |                 |



- ment, using the APL programming language. Primarily for nonscience majors. This course is an alternative to Math 10. Prerequisite: Math 12. (Spring)
- 30 **Precalculus** (3) Stone and Staff  
Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. (Fall and spring)
- 31 **Single-Variable Calculus I** (3) Glick and Staff  
Differentiation and integration of algebraic and transcendental functions with applications. Prerequisite: Math 30 or equivalent. (Fall and spring)
- 32 **Single-Variable Calculus II** (3) Glick and Staff  
Techniques of integration, Taylor formula, L'Hopital's rules. Infinite series; polar coordinates; 3-dimensional vectors. Prerequisite: Math 31. (Fall and spring)
- 33 **Multivariable Calculus** (3) Glick and Staff  
Vector-valued functions. Partial differentiation. Multiple integrals. Topics in vector calculus, including the theorems of Gauss, Green, and Stokes. Prerequisite: Math 32. (Fall and spring)
- 41 **Calculus for Economists I** (4) Junghenn and Staff  
Differentiation and integration of algebraic and elementary transcendental functions; marginal analysis for functions of one variable; optimization of functions of one variable applied to economics. Prerequisite: Math 30 or equivalent. (Fall)
- 42 **Calculus for Economists II** (4) Junghenn and Staff  
Elementary linear algebra with economics applications, including input-output models; partial derivatives; multiple integrals; marginal analysis for functions of several variables; optimization of functions of several variables applied to economics; infinite series. Prerequisite: Math 41. (Spring)
- 51 **Finite Mathematics for the Social and Management Sciences** (3) Glick and Staff  
Systems of linear equations, matrix algebra, linear programming, and mathematics of finance. Prerequisite: Math 3 or equivalent. (Fall and spring)
- 52 **Calculus for the Social and Management Sciences** (3) Glick and Staff  
Differential and integral calculus of functions of one variable; applications to business and economics. Prerequisite: Math 51 or equivalent. (Fall and spring)
- 101 **Introduction to Mathematical Logic** (3) Harizanov  
Symbolic logic as a precise formalization of deductive thought. Logical correctness of reasoning. Formal languages, interpretations, and truth. Propositional logic and first-order quantifier logic suited to deductions encountered in mathematics. Prerequisite: Math 32 or permission of instructor. (Fall, odd years)
- 102 **Axiomatic Set Theory** (3) Harizanov  
Cantor's theory of sets. Russell's paradox. Axiomatization of set theory as a framework for a contradiction-free mathematics. Finite, countable, and uncountable sets; ordinal and cardinal numbers; the axiom of choice. Prerequisite: Math 101 or permission of instructor. (Spring, odd years)
- 105 **Problem Solving and Mathematical Proofs** (3) Ullman  
Types of reasoning encountered in mathematics. Techniques of problem solving and writing proofs. Induction. Relations. Cardinality. Introduction to the major subdisciplines of mathematics. Prerequisite: Math 32. (Spring)
- 106 **Introduction to Topology** (3) Stone and Staff  
Metric spaces: completeness, compactness, continuity. Topological spaces: continuity, bases, subbases, separation axioms, compactness, local compactness, connectedness, product and quotient spaces. Prerequisite: Math 139 or permission of instructor. (Fall)
- 107 **Introduction to Algebraic Topology** (3) Robinson and Staff  
The fundamental group, covering spaces, simplicial homology, and the Euler characteristic. Topics may include surfaces, knot theory, and the Jordan curve theorem. Necessary concepts from topology and algebra included. Prerequisite: Math 124 and 139 or permission of instructor.
- 111 **Mathematics for Engineers and Physicists I** (3) Hockett  
Differential equations. Laplace transform. Series solutions of differential equations. Boundary value problems. Prerequisite: Math 33. (Fall)

- 112 **Mathematics for Engineers and Physicists II (3)** Hockett  
Vector analysis. First- and second-order partial differential equations. Topics in complex variables. Prerequisite: Math 111. (Spring)
- 113 **Introduction to Combinatorics (3)** Simion and Staff  
General introduction to combinatorial enumeration and graph theory. Basic counting techniques, inclusion-exclusion principle, recurrence relations, generating functions, pigeonhole principle, bijective correspondences, basic graph theory, applications. Prerequisite: Math 32; Math 132 is recommended but not required. (Fall and spring)
- 120 **Elementary Number Theory (3)** Bonin and Staff  
Divisibility of integers, prime numbers, greatest common divisor, the Euclidean algorithm, congruence, the Chinese remainder theorem, number theoretic functions, Mobius inversion, Euler's Phi function, primitive roots and indices, applications to cryptography, and primality testing. Prerequisite: three years of high school mathematics.
- 121 **Introduction to Abstract Algebra I (3)** Katz and Staff  
The concept of group, subgroups, Lagrange's theorem, normal subgroups, homomorphisms, Cayley's theorem, abelian groups, applications to counting problems, cryptosystems, integer programming, crystallographic groups. Prerequisite: Math 32 and Math 124 or permission of instructor. (Fall)
- 122 **Introduction to Abstract Algebra II (3)** Katz and Staff  
The concept of ring, polynomial rings, subrings, ideals, quotient rings, unique factorization, fields, field extensions, splitting fields, geometric problems, Galois theory, block designs, error-correcting codes. Prerequisite: Math 121. (Spring)
- 123 **Linear Algebra (3)** Katz  
Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms, spectral decomposition, similarity. Prerequisite: Math 124. (Spring)
- 124 **Linearity and Matrices (3)** Katz  
Linear equations, matrices, inverses, and determinants. Vector spaces, rank, eigenvalues, diagonalization, and quadratic forms. Applications to linear ordinary differential equations. Prerequisite: Math 32 or 42 or permission of instructor. (Fall, spring, and summer)
- 132 **Introduction to Discrete Structures (3)** Staff  
Joint offering of the Statistics and Mathematics Departments. Discrete structures and associated mathematical tools. Topics include sets, functions, relations, directed and undirected graphs, propositional calculus, Boolean algebras, with applications to computer science. Prerequisite: Stat 130 and Math 31. (Fall)
- 134 **Introduction to Boundary-Value Problems (3)** Gupta and Staff  
The solution of boundary value problems in linear PDEs. Green's functions, separation of variables, Fourier analysis, Sturm-Liouville theory and methods. Prerequisite: Math 112 or 142 or permission of instructor. (Fall)
- 139 **Advanced Calculus I (3)** Junghenn and Staff  
A rigorous study of differentiation, integration, and convergence. Topics covered: sequences and series, continuity and differentiability of real valued functions of a real variable, the Riemann integral, sequences of functions, and power series. Prerequisite: Math 33 or equivalent. (Fall)
- 140 **Advanced Calculus II (3)** Junghenn and Staff  
Continuation of Math 139. Topics covered include topology of  $\mathbb{R}^n$ , derivatives of functions of severable variables, inverse function theorem, implicit function theorem, multiple integrals, Stokes's theorem. Prerequisite: Math 139 or equivalent. (Spring)
- 141 **Differential Geometry (3)** Baginski  
Curves in space, regular surfaces, tensors, fundamental forms of a surface, Gauss's Theorema Egregium, Gauss-Bonnet theorem, minimal surfaces, theory of relativity. Prerequisite: Math 140; Math 123 or 124 or permission of instructor. (Fall)
- 142 **Introduction to Differential Equations (3)** Glick and Staff  
Linear and some nonlinear differential equations. Topics include existence theorems, stability, control theory, limit cycles, and applications to physics and ecology. Prerequisite: Math 139 and 123 or 124, or permission of instructor. (Spring)



- 153 Introduction to Numerical Analysis (3)** Gupta and Staff  
Accuracy and precision. Linear systems and matrices. Direct and iterative methods for solution of linear equations. Sparse matrices. Solution of non-linear equations. Interpolation and approximate representation of functions, splines. Prerequisite: Math 33 or equivalent and some knowledge of computer programming. (Fall, even years)
- 157 Introduction to Complex Variable Theory (3)** Glick and Staff  
Analytic functions. Power series. Contour integration and calculus of residues. Conformal mapping. Physical applications. Prerequisite: Math 139 or permission of instructor. (Spring)
- 170 Computational Complexity (3)** Harizanov  
Deterministic and nondeterministic Turing machines. Partial recursive functions and the Church-Turing thesis. Undecidable problems. Space and time complexity measures. Gap, speed-up, and union theorems. Decidable but intractable problems. The traveling salesman problem and other NP-complete problems. Prerequisite: Math 32 or permission of instructor.
- 181-82 Seminar: Applied Mathematics (3-3)** Glick and Staff  
Topics may include fractals; network flows and combinatorial optimization; linear programming automata theory and the theory of computation; information theory and coding theory; dynamical systems; queuing theory. Prerequisite: Math 124 and 139 or permission of instructor. (Academic year)
- 191 Special Topics (arr.)** Staff  
Admission by permission of instructor. May be repeated for credit. Offered upon demand.
- 195 Reading and Research (arr.)** Staff  
Under the personal direction of an instructor. Limited to mathematics and applied mathematics majors with demonstrated capability. Prior approval of instructor required. May be repeated for credit. (Fall and spring)

## MECHANICAL ENGINEERING

See Civil, Mechanical, and Environmental Engineering.

## MIDDLE EASTERN STUDIES

**Program Committee:** N. Brown (Director), M.A. Atkin, R.K. Lewis, W.H. Lewis, B. Reich, H.M. Sachar

The Elliott School of International Affairs offers a multidisciplinary program leading to a Bachelor of Arts with a major in the field of Middle Eastern Studies.

*Bachelor of Arts with a major in Middle Eastern studies*—The following requirements must be fulfilled:

1. General requirements—6 credit hours of English, 6 hours of mathematics or physical science, 6 hours of humanities, and course work in a foreign language through the third-year level. Students are encouraged to study a Middle Eastern language. Hebrew is offered regularly at GW; other Middle Eastern languages may be taken through the Consortium.
2. Social sciences—(a) Hist 40 and 72; (b) Econ 11-12 and 6 credit hours selected from 136, 151, 181, and 182; (c) PSc 1 and 2.
3. Middle Eastern studies—(a) 9 credit hours selected from Hist 107, 108, 193, and 194; (b) 9 hours selected from PSc 176, 177, 178, 179, and 180; (c) 6 hours selected from Rel 113, 114, 161, 163, 164, and 165; (d) 9 additional hours of course work related to the Middle East selected from any department.
4. Electives: Students must take sufficient electives to complete the program with 120 credit hours.

The following courses pertain to Middle Eastern studies.

- Anth 177 *Cultures of the Near East*  
Art 112 *Egypt and the Near East*  
Art 116 *Islamic Art*  
Clas 21-22 *Beginning Hebrew*  
Clas 23-24 *Intermediate Hebrew*

- Clas 100 *Modern Hebrew Literary Classics*  
 Clas 101 *Israeli Society and Culture: Literary Perspectives*  
 Clas 102 *Contemporary Israeli Short Stories and Poetry*  
 Clas 103 *Modern Hebrew Nonfiction*  
 Clas 104 *Modern Hebrew Fiction*  
 Econ 151 *Economic Development*  
 Geog 154 *Geography of the Middle East and North Africa*  
 Hist 107 *The Ancient Near East and Egypt to 322 B.C.*  
 Hist 108 *Greece and the Near East, 359 B.C. to the Second Century A.D.*  
 Hist 117 *Crisis or Conspiracy? A History of the International Politics of Oil*  
 Hist 193 *History of the Near East*  
 Hist 194 *History of the Modern Near East*  
 PSc 176 *The Arab-Israeli Conflict*  
 PSc 177 *Government and Politics of the Middle East*  
 PSc 178 *International Relations of the Middle East*  
 PSc 179 *Israeli Politics and Foreign Policy*  
 PSc 180 *Government and Politics of North Africa*  
 Rel 9 *The Hebrew Scriptures*  
 Rel 103 *The Prophets*  
 Rel 113 *Early Post-Biblical Judaism*  
 Rel 115 *Jewish Philosophy in the Medieval Period*  
 Rel 161 *Islam*  
 Rel 163 *Islamic Religion and Art (same as Art 119)*  
 Rel 164 *Islamic Philosophy and Theology*  
 Rel 165 *Sufism (Islamic Mysticism)*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

## MUSIC

Professors G. Steiner (Emeritus), R. Parris, R.J. Guenther (Chair)  
 Associate Professors C.J. Pickar, L. Youens  
 Adjunct Associate Professor M. Garst (Piano)  
 Assistant Professor K. Ahlquist  
 Adjunct Assistant Professors J.E. White (Voice), S.K. Kim (Piano), J. Albertson (Guitar),  
 F.B. Conlon (Piano), M. Sislen (Guitar), A. Lee (Voice), J.D. Levy (Jazz Improvisation), M.  
 Peris (Piano), T. Konstantinov (Piano), B. Fritz (Band), R. Baker (Voice)  
 Assistant Professorial Lecturers B. Feinstein, C.M. Dunham, S. Hilmy (Electronic Studio)  
 Adjunct Instructors M. Findley (Violin), L. Barnett (Cello), P. Gieseler (Voice), E. Guenther  
 (Organ), L. Lipnick (Bassoon), R.J. Pallansch (Tuba), R. Parnas (Violin and Viola), B.R.  
 Seidman (Harp), S. Wellman (Voice), R. White (Oboe), W.R. Wright (Clarinet and  
 Saxophone), P. Edgar (Percussion), S.M. Fearing (French Horn), E.C. Thayer (French  
 Horn), E.U. Kiehl (Trombone), D. Marsh (Electric Bass), M. Von Villas (Opera), J.C.  
 Connell (Percussion), T. Perazzoli (Flute), J. Krash (Piano), L. Hertel (Flute), R. Birch  
 (Trumpet), E. Waters (Guitar), C. Marvray (Percussion)

*Bachelor of Arts with a major in music*—The following requirements must be fulfilled:

1. The general requirements stated under *Columbian College and Graduate School of Arts and Sciences*.
2. Prerequisite courses—Mus 1-2, 5-6 and two semesters each of Mus 9, 10; 8 hours of applied music courses in the student's principal performance area.
3. The language competence option listed under the *General Curriculum Requirements of Columbian College*.
4. Required courses in the major—Mus 101-2, 103-4; 4 hours of music ensemble courses; 4 additional hours either in applied music or music ensemble courses. Music majors must meet the departmental requirement for proficiency in piano. All majors are expected to attend and perform regularly in student recitals in accordance with minimum departmental requirements.

*Bachelor of Music*—Admission to the *Bachelor of Music* degree program with a major in performance requires demonstration of special advanced pre-admission training and aptitude. In addition to the general requirements stated under *Columbian College and Graduate School of Arts and Sciences*, the 129-credit-hour program requires music courses as



follows: Mus 1-2, 5-6, 9-10 (two semesters each), 101-2, 103-4, 131-32, 139, 151, 199; 6 hours of ensemble courses; 12 hours of applied music courses; 15 hours of additional courses in performance; and 4 hours of electives. The departmental requirement of proficiency in piano must be satisfied by the end of the junior year. Students in this program are required to pursue the language competence option listed under the General Curriculum Requirements of Columbian College. A full public recital is required, generally during the senior year.

**Minor in Music**—20 credit hours of music courses, consisting of Mus 1-2 or 5-6, two music history courses (Mus 101-2 or 103-4), 4 credit hours of piano study, and 2 credit hours of ensemble participation. Students with sufficient piano proficiency, as determined by an audition, may elect another applied music area for concentration. Recital attendance and public performance are required.

**Departmental Prerequisites:** Mus 1-2 and 9 are prerequisite to all other courses required of music majors with the exception of applied music and ensemble courses. A student must pass a performance audition in piano and must achieve a grade of C or better in Mus 2 and 9 to be allowed to declare the music major in the B.A. curriculum. All students majoring in music are required to emphasize performance study in one instrument or voice. Placement auditions to determine the beginning level of study are administered at the time the major is declared. Satisfactory progress in the principal performance area, as determined by the department's repertoire and study-level guidelines and regular applied music jury examinations, is required for continuance in the major. Attendance at a minimum number of public concerts and recitals is required of all music majors as a part of their applied music study.

## MUSIC THEORY, HISTORY, AND LITERATURE

- |  |          |
|--|----------|
| <b>1-2 Elements of Music Theory (3-3)</b>  | Pickar   |
| Theoretical and written coverage of notation, scales, keys, intervals, terms, rhythms, and chord structure and progression. Introduction to music literature, with emphasis on rudimentary aural analysis. Concurrent registration in the appropriate section of Mus 9 is required for music majors. Mus 1 is prerequisite to Mus 2. (Academic year) |          |
| <b>3 Introduction to Musical Understanding (3)</b>   | Staff    |
| Introductory history of musical styles, related to listening; study of music materials and media. Not open to music majors. (Fall and spring)  |          |
| <b>4 Survey of Music Literature (3)</b>  | Staff    |
| Introductory study of musical forms, structures, and textures; aural analysis of selected literature. Not open to music majors. (Spring)   |          |
| <b>5-6 Harmony (3-3)</b>   | Parris   |
| Triads, inversions; chord analysis, construction, and progression; figured-bass realization, part writing, modulation, altered chords. Concurrent registration in the appropriate section of Mus 10 is required for music majors. Prerequisite: Mus 1-2; Mus 5 is prerequisite to Mus 6. (Academic year)   |          |
| <b>7 Music of Non-Western Cultures (3)</b>   | Staff    |
| Introductory survey of the basic systems and styles of music in the major cultures of the Eastern Hemisphere and Africa.   |          |
| <b>8 History of Jazz (3)</b>   | Dunham   |
| Introduction to the styles, composers, and performers of jazz music from its origins to the present. (Fall)  |          |
| <b>9 Ear Training I (1)</b>  | Ahlquist |
| Aural skills development through melodic, harmonic, and rhythmic dictation and sight singing. Content is coordinated with Mus 1 (section .10) and Mus 2 (section .11). Two 50-minute sessions per week. May be repeated for credit. (Fall and spring)  |          |
| <b>10 Ear Training II (1)</b>  | Ahlquist |
| Continuation of Mus 9. Content is coordinated with Mus 5 (section .10) and Mus 6 (section .11). Two 50-minute sessions per week. May be repeated for credit. (Fall and spring)   |          |
| <b>101-2 History of Music I (4-4)</b>  | Youens   |
| Development of music in the Western world from the early Christian era through the Baroque. Weekly analysis seminar. Mus 101 is prerequisite to Mus 102. (Academic year)   |          |

- 103-4 History of Music II (4-4)** Ahlquist  
Development of Western music from the Classical period to the present. Weekly analysis seminar. Mus 103 is prerequisite to Mus 104. (Academic year)
- 109 Orchestra Literature (3)** Staff  
Survey of the history and styles of orchestra literature, analysis of representative works.
- 110 Chamber Music Literature (3)** Staff  
Survey of the history and styles of chamber music literature, analysis of representative works.
- 121 The Opera (3)** Von Villas  
Survey of the history and styles of opera, analysis of representative works. (Fall)
- 125 Keyboard Music Literature (3)** Staff  
Survey of the history, style, and major content of the keyboard literature from the 16th century to the present.
- 131-32 Advanced Theory (3-3)** Parris  
Practice in 18th-century contrapuntal writing and analysis, chorale preludes, inventions, and fugues. Prerequisite: Mus 5-6 or equivalent. (Academic year)
- 133-34 Composition (3-3)** Parris  
(Academic year)
- 135 Counterpoint (3)** Parris  
Study and practice of 16th-century contrapuntal techniques. (Fall)
- 137 Orchestration (3)** Parris  
Instrumental scoring.
- 139 Form and Analysis (3)** Parris  
Analysis of musical forms in representative musical literature. (Spring)
- 151 Conducting (3)** Wright  
Technique of conducting, score reading, rehearsal procedures, analysis, and interpretation of selected musical literature; practice in conducting. (Fall, odd years)
- 160-61 Electronic Music (3-3)** Hilmy  
Tape and electronic techniques, synthesizer use, and acoustical principles. (Academic year)
- 173 Pedagogy (3)** Staff  
Principles, materials, and methods of teaching in selected areas.
- 175 Performance Practices in Selected Areas (3)** Garst  
An investigation of the problems of accurate interpretation of music of selected periods through the use of historical and modern literature and its application to the actual music. Topic to be announced in the *Schedule of Classes*. (Fall, odd years)
- 199 Independent Research (3)** Staff  
Under the guidance of an assigned instructor. Open only to qualified music majors. May be repeated for credit. (Fall and spring)

## APPLIED MUSIC

Applied music courses are offered both fall and spring, and may be repeated for credit. Mus 51, 52, 53, 55, 56, and 153 do not include individual lessons and do not require a supplementary fee. All other applied music courses include individual lessons and require a supplementary fee, as follows:

1. One-credit-hour courses: individual lessons of one-half hour a week, supplementary fee, \$75.

2. Two- or three-credit-hour courses: individual lessons of one hour a week, supplementary fee, \$150.

Supplementary fees for applied music courses are nonrefundable after the first three weeks of the fall and spring semesters. Consult the Music Department for details.

The supplementary fee is waived for full-time music majors and minors.

**Required practice:** three hours a week for one-credit-hour courses and six hours a week for two-credit-hour courses.

11-12 Piano (1-2)

13-14 Voice (1-2)

15-16 Organ (1-2)

Staff

Staff

E. Guenther



17-18 Violin (1-2)	Staff
19-20 Classical Guitar (1-2)	Albertson, Sislen
21-22 Viola (1-2)	Parnas
23-24 Cello (1-2)	Barnet
25-26 Bass (1-2)	Marsh
27-28 Flute (1-2)	Perazzoli
29-30 Recorder (1-2)	Staff
31-32 Oboe (1-2)	R. White
33-34 Clarinet (1-2)	Wright
35-36 Saxophone (1-2)	Wright
37-38 Bassoon (1-2)	Lipnick
39-40 French Horn (1-2)	Fearing, Thayer
41-42 Trumpet (1-2)	Birch
43-44 Trombone (1-2)	Kiehl
45-46 Percussion (1-2)	Edgar, Connell
47-48 Harp (1-2)	Seidman
49-50 Tuba (1-2)	Pallansch
51 Orchestra (1)	Wright
Preparation and performance of orchestral literature. Prerequisite: audition before director.	
52 Instrumental Ensemble (1)	Staff
Chamber ensemble groups approved by audition. (See the Schedule of Classes for complete listing.)	
53 University Singers (1)	Pickar
Preparation and performance of choral literature. Prerequisite: audition before director.	
55 Jazz Band (1)	Levy
Preparation and performance of classic and contemporary "big band" literature. Prerequisite: audition before director.	
56 University Band (1)	Fritz
57-58 Harpsichord (1-2)	Garst, Parris
59-60 Jazz Performance Techniques (1-2)	Staff

**Departmental prerequisite:** audition to meet departmental requirements.

**Required practice:** six hours a week for 1-credit-hour courses and 12 hours a week for 3-credit-hour courses. In addition, 3-credit-hour courses include master performance classes and require performance on student recitals.

111-12 Piano (1-3)	Staff
113-14 Voice (1-3)	Staff
115-18 Organ (1-3)	E. Guenther
117-18 Orchestral Instrument (1-3)	Staff
119-20 Classical Guitar (1-3)	Albertson, Sislen
153 Vocal Theater Workshop (1)	Von Villas, Conlon
A performance-oriented program. In the fall semester the stress is on development of body awareness for the stage, acting improvisations, and character development. Scenes chosen from the opera, operetta, and musical theater repertoire. In the spring semester, musical coaching, use of makeup, and audition preparation is included.	
155-156 Voice Study for the Theatre (1-3)	Staff
157-158 Harpsichord (1-3)	Garst, Parris

## NATIONAL CENTER FOR COMMUNICATION STUDIES

See Communication Studies.

## NAVAL SCIENCE

Professor C.J. VanArsdall (Chair)

Associate Professor J.B. Carter, Jr.

Assistant Professors C.A. Cox, D.T. Perry, J.B. Cashmere, D.E. Sewell, J.P. Melendez, J.J. Petto

### Naval Reserve Officers Training Corps Program

The Naval Reserve Officers Training Corps (NROTC) offers young men and women the opportunity to qualify for a full scholarship and a commission in the Navy or Marine Corps. NROTC midshipmen are required to complete the naval science courses and attend weekly professional seminars. During the summer, NROTC midshipmen participate in active duty at sea or shore-based training cruises for approximately four weeks. Upon receiving the baccalaureate and completing the NROTC program, qualified midshipmen are commissioned as ensigns in the Navy or second lieutenants in the Marine Corps. Students may join the NROTC through any one of the following four programs.

**Four-Year Scholarship Program**—Students enter the NROTC Four-Year Scholarship Program through national competition and are appointed midshipmen in the Naval Reserve. While enrolled, the government provides tuition, fees, books, uniforms, and an allowance of \$100 per month. Upon graduation, students are commissioned with a four-year active duty service obligation. Scholarship Program students must include in their degree program courses in English, calculus, computer science, physics, national security policy, technical electives, and naval science and participate in three summer training periods of approximately four weeks each.

**Two-Year Scholarship Program**—Selection for this program is made through national competition, based on the student's academic record, physical qualifications, and an interview. Application should be made by the middle of the fall semester of the student's sophomore year. Selected applicants attend six weeks of instruction at the Naval Science Institute (NSI) at Newport, Rhode Island, during the summer before their third academic year. At NSI, students take courses in naval science, physical fitness, and drill, similar to those required of four-year NROTC students during their freshman and sophomore years. Successful completion of the NSI qualifies the two-year applicants for appointment as midshipmen in the Naval Reserve and enrollment in the NROTC Scholarship Program. Upon acceptance of this appointment, students receive all the benefits and assume all the obligations of midshipmen in the Four-Year Scholarship Program.

Entering freshmen and transfer students who are awarded NROTC scholarships and plan to live on campus may also be eligible for GW Residence Hall Awards from the University. NROTC scholars with prior experience in the Navy are eligible for awards covering the average charges for on-campus housing and meals. NROTC scholars who are new to the Navy and are majoring in mathematics, chemistry, physics, or a program in the School of Engineering and Applied Science may receive \$4,000 to be applied toward the costs of on-campus housing and meals. Further information on these awards is available from the University Office of Admissions.

**Four-Year College Program**—Students are enrolled in the Four-Year College Program upon acceptance by the Department of Naval Science. Uniforms are provided, and during their junior and senior years, students receive \$100 per month. Students must include in their degree program courses in mathematics, science, and naval science, attend the first class summer at-sea training period, accept a commission in the Naval Reserve or Marine Corps Reserve on graduation with an eight-year active reserve service obligation, and serve on active duty after graduation for at least three years. After commissioning, application for transfer to the regular Navy or Marine Corps may be made. Midshipmen who complete one term as College Program students, have a satisfactory academic record, and are physically qualified may compete for a scholarship awarded by the Chief of Naval Education and Training. If awarded, the scholarship will be for the remainder of the student's undergraduate enrollment, up to a maximum of three and a half years; service requirements and benefits are the same as for the scholarship programs.

**Two-Year College Program**—Application should be made by the middle of the fall semester of the student's second year. Selections are made through the Chief of Naval Education and Training, based on the student's academic record, physical qualifications, and an interview. Those students selected will attend the NSI and upon successful completion may enroll in the program. The benefits and obligations are the same as for the Four-Year College Program.

**Requirements for all candidates**—Qualifications for acceptable candidates for the Scholarship Program or the College Program include U.S. citizenship, fulfillment of physical requirements, and willingness to participate in required summer training periods and to accept a commission in the Navy, Marine Corps, Naval Reserve, or Marine Corps Reserve when offered.



Enrollment in NROTC is not a requirement for taking naval science courses. Any student enrolled at George Washington University may take naval science courses with the approval of the Professor of Naval Science.

### Degree Credit for Naval Science Courses

*Columbian College*—NSc 126, 160, and 180 are acceptable as history electives. Up to 12 credit hours (for NSc 52, 150, 175, and 176) may be accepted as professional electives in Columbian College.

*School of Engineering and Applied Science*—NSc 126 may be used for social science credit. Technical elective credit is acceptable as follows: for majors in civil engineering and mechanical engineering—NSc 52, 150, 175; for majors in electrical engineering—NSc 52 and 150; for majors in systems analysis and engineering—NSc 150, 151, 175, and 176.

*School of Education and Human Development*—NSc 126, 160, 175, 176, and 180 may be accepted for social science elective credit in the following undergraduate programs: elementary education, human services, and special education. All naval science courses are acceptable as elective credit in the travel and tourism and exercise and sport science programs.

*School of Business and Public Management*—NSc 175 and 176 may be used as equivalents for SMPP 191 and Mgt 110, respectively, by students in both the B.B.A. and B.Accy. degree programs. For B.B.A. students, any other naval science courses may be used to fulfill science, social science, or elective requirements. For B.Accy. students, any one of the remaining naval science courses may be used to fill an elective requirement.

*Elliott School of International Affairs*—NSc 126, 160, and 180 may be used as elective credit in all undergraduate programs.

#### 51 Introduction to Naval Science (3)

A general introduction to the naval profession and to concepts of sea power. The mission, organization, and warfare components of the U.S. Navy and Marine Corps. Overview of officer and enlisted ranks and rates, training and education, and career patterns. Naval courtesy and customs, military justice, leadership, and nomenclature. Professional competencies required to become a naval officer.

#### 52 Naval Ships Systems I (Engineering) (3)

A detailed study of ship characteristics and types, including ship design and control, propulsion, hydrodynamic forces, stability, compartmentation, and electrical and auxiliary systems. Included are basic concepts of the theory and design of steam, gas turbine, and nuclear propulsion.

#### 125 Naval Ships Systems II (Weapons) (3)

Theory and employment of weapons systems, including the processes of detection, evaluation, threat analysis, weapon selection, delivery, guidance, and explosives. Fire control systems and major weapons types, including capabilities and limitations. Physical aspects of radar and underwater sound. Facets of command, control, and communications as means of weapons system integration.

#### 126 Sea Power and Maritime Affairs (3)

A survey of the U.S. naval history, from the American Revolution to the present, with emphasis on major developments. The geopolitical theory of Mahan. Present-day concerns in sea power and maritime affairs, including the economic and political issues of merchant marine commerce, the law of the sea, the Soviet navy and merchant marine, and a comparison of U.S. and Soviet naval strategies.

#### 150 Navigation and Naval Operations I (3)

Students develop practical skills in both piloting and celestial navigation. Charts, visual and electronic aids, and theory and operation of magnetic and gyro compasses. The celestial coordinate system; spherical trigonometry, theory and operation of the sextant, and step-by-step treatment of the sight-reduction process. Other topics include tides, currents, effects of wind and weather.

#### 151 Navigation and Naval Operations II (3)

A study of the international and inland rules of the nautical road, relative-motion vector-analysis theory, relative motion problems, formation tactics, and ship employment. Introduction to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, and afloat communications.

**160 Evolution of Warfare (3)**

This course traces the development of warfare, from earliest recorded history to the present, with focus on the impact of major military theorists, strategists, tacticians, and technological developments. The student acquires a basic sense of strategy and develops an understanding of military alternatives and the impact of historical precedent on military thought and actions.

**175 Leadership and Management I (3)**

Organizational behavior and management in the context of naval organization. The management functions of planning, organizing, and controlling; individual and group behavior in organizations; motivation and leadership. Experiential exercises, case studies, and laboratory discussions. Decision making, communication, responsibility, authority, and accountability.

**176 Leadership and Management II (3)**

The interaction of leadership, organizational behavior, and human resource management. Employee interviewing and counseling, performance appraisal, military and civilian law, and managerial ethics and values. This capstone course integrates professional competencies to develop understanding of the issues faced by leaders, managers, and naval officers.

**180 Amphibious Warfare (3)**

A historical survey of the development of amphibious doctrine and the conduct of amphibious operations. The evolution of amphibious warfare in the 20th century, especially during World War II. Present-day potential and limitations on amphibious operations, including the concept of rapid deployment force.

**OPERATIONS RESEARCH**

Professors W.H. Marlow, D. Gross, N.D. Singpurwalla, A.V. Fiocco, G.P. McCormick, J.E. Falk (Acting Chair), R.M. Soland  
 Adjunct Professors R.H. Clark, T.W. Kelly  
 Professorial Lecturers C. Anello, G.R. McNichols, D.R. Edmonds, J.F. Ince, S.E. Nevius, H.L. Eskew, M.F. McGrath, L.B. Anderson, A. Greenland, N.J. Plotkin, R.S. Sheldon, D.K. Wagner, R. Srinivasan, J.D. Waller  
 Associate Professor T.A. Mazzuchi  
 Associate Professorial Lecturers W.S. Lassiter, D.J. Gantzer, M.A. Ahmed  
 Assistant Professor T.Z. Irony  
 Assistant Professorial Lecturer M.A. Youngren

See the School of Engineering and Applied Science for the program of study leading to the Bachelor of Science (Systems Analysis and Engineering).

- 101 Survey of Operations Research: Deterministic Models (3)** Falk and Staff  
 Basic concepts and techniques of deterministic operations research modeling as applied to problems in industrial, governmental, and military decision making. Linear, integer, nonlinear, and dynamic programming; networks; game theory. Prerequisite: Math 33. (Fall)

- 102 Survey of Operations Research: Stochastic Models (3)** Mazzuchi and Staff  
 Basic concepts and techniques of stochastic operations research modeling as applied to problems in industrial, governmental, and military decision making. Markov chains, queuing, inventory, forecasting, decision analysis, regression analysis, and simulation. Prerequisite: ApSc 115, Math 33. (Spring)

- 109 Mathematics in Operations Research (3)** Fiocco, Marlow, and Staff  
 Foundations of optimization theory: linear algebra, advanced calculus, real analysis. Geometrical interpretations. Numerical methods and use of software. Applications to modeling techniques in operations research. Prerequisite: Math 33. (Fall and spring)

- 135 Systems Thinking and Policy Modeling I (3)** Clark and Staff  
 Stock-flow analysis of feedback systems presented for policy analysis and management. System dynamics; principles of systems employed to structure the problem-solving process. Problems and case studies solved using micro-computers. (Fall and summer)

- 151 Linear Programming (3)** Falk and Staff  
 The Simplex method, its variants, and recent interior methods considered from theoretical and computational points of view. Duality, sensitivity, and para-



- metric programming. Large-scale optimization. Prerequisite: OR 101, 109 or permission of instructor. (Fall and spring)
- 173 **Discrete Systems Simulation (3)** Staff  
Monte Carlo simulation of discrete stochastic models. Simulation languages. Random-number and random-deviate generation. Statistical design and analysis of simulation experiments. Validation of simulation models. Applications: queuing, inventory, scheduling, computer models. Prerequisite: ApSc 116, CSci 51, OR 102; or permission of instructor. (Spring)
- 190 **Applied Systems Analysis and Engineering (3)** Soland and Staff  
Practical and professional aspects of systems analysis and engineering. Use of existing computer software and various modeling approaches. Analysis and solution of case studies and design problems. Students use the decision support systems laboratory. Prerequisite: CSci 144; OR 101, 102. (Fall)
- 191 **Problems in Operations Research (3)** Fiacco and Staff  
Field experience in operations research on a team basis. Each small group locates an actual problem and formulates a solution using operations research models. Prerequisite or concurrent registration: OR 190. (Fall and spring)

## PEACE STUDIES

### Committee on Peace Studies

P. Caws, P. Churchill, T. L. Hufford, C. Joyner, M. Moore, P. Palmer, J. Post, M. Price, H. Yeide (Coordinator), A. Ziffren

Students in Columbian College and Graduate School of Arts and Sciences or the Elliott School of International Affairs may earn a minor in peace studies by taking 18 credit hours that include PStd 10 and 190 plus at least one course from each of the following groups.

*Peace as a Human Value*—Phil 133; Rel 121; WStu 125.

*Peace and National and International Systems*—Econ 136, 181; Geog 133; Hist 128–29, 157, 184; PSc 140, 142, 144, 149.

*Peace and Interpersonal Relations*—Comm 175; Psyc 119, 129, 156; Soc 134.

With approval of the advisor, Selected Topics courses and 700 Series courses in related subjects may be counted toward the minor. An internship in a relevant agency (through SLP 152) may also count for 3 hours of credit, with advisor's prior approval.

- 10 **Introduction to Peace Studies and Conflict Resolution (3)** Staff  
Exploration of the nature of war and its causes; peace as a negative concept (absence of war) and as a positive concept (basis for long-range, harmonious, social, political, and economic institutions of international scope); and the transition from the negative to the positive concept.
- 190 **Peace Studies Seminar (3)** Staff  
Integration of previous academic experience related to peace studies and a groundwork for possible future engagement with peace concerns through graduate work, career choice, or volunteer activities. To be taken in the semester when requirements for the minor are completed.

## PHARMACOLOGY

Programs in pharmacology are offered at the graduate level by Columbian College and Graduate School of Arts and Sciences. Courses listed here are open to interested undergraduates.

- 115 **Nonmedical Use of Licit and Illicit Drugs (3)** Cohn  
The pharmacology of alcohol, narcotics, depressants, stimulants including cocaine, and psychoactive drugs including marijuana, LSD, and PCP. Bases of drug use, dependence, and treatment. Historical, economic, political, and legal aspects of drug use. No science prerequisites. (Spring)
- 170 **Introduction to Pharmacology and Toxicology (3)** Staff  
Basic principles underlying the absorption, distribution, metabolism, and excretion of drugs and toxic substances. Mechanisms of toxicity, including mutagenesis, carcinogenesis, and specific organ toxicity. Prerequisite: permission of the instructor. Same as PubH 170. (Fall)

## PHILOSOPHY

University Professors P.J. Caws, K.F. Schaffner

Professors R.H. Schlagel, R.S. French, W.B. Griffith, R.P. Churchill (Chair)

Associate Professor A. Altman

Adjunct Associate Professor G.M. Bowles

Assistant Professors D. DeGrazia, G. Weiss

Adjunct Assistant Professor J.J. Glover

**Bachelor of Arts with a major in philosophy**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Required courses in related areas—9 hours selected from art history, classics (Clas 71, 72, 113, 127), history (Hist 39–40 recommended), humanities, or music history; 3 hours of non-Western religious philosophy selected from Rel 157, 158, 160, 161, or 164.

3. Required courses in the major—a minimum of 30 credit hours, including as foundational courses Phil 111, 112, 131, and 152; one course selected from Group A (normative)—Phil 132, 133, 142, 162; one course selected from Group B (epistemological)—Phil 121, 125, 151, 153; two courses selected from Group C (19th- and 20th-century)—Phil 113, 172, 192, 193; the senior seminar—Phil 198; plus 3 credit hours of elective 100- or 200-level courses, selected in consultation with a departmental advisor.

For students considering continuing in graduate school, it is recommended that they include in their programs of study 6 credit hours of French or German plus Phil 121, 151, 192, and 193.

**Minor in philosophy**—Required: a minimum of 18 credit hours of philosophy courses, including two courses chosen from Phil 51, 52, 111, 112, 113; one course chosen from Phil 127, 131, 132, 133, 135, 142, 162; and one course chosen from Phil 121, 151, 152, 153.

**Minor in applied ethics**—Required: 18 credit hours of philosophy courses, including Phil 51 or 52, and 131 and 132, plus three courses selected from Phil 133, 135, 142, 751 (Current Issues in Bioethics); with permission of the instructor, seniors may select from Phil 230, 231, 235, 242, 262, which are listed in the Graduate Programs Bulletin.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- |       |  |                   |
|-------|--|-------------------|
| 45    | <b>Introduction to Logic</b> (3)   | Churchill, Bowles |
|       | Introduction to methods of deductive and inductive logic with emphasis on sentential calculus. Argument analysis, recognition of fallacies, legal reasoning, and practical applications of logic. (Fall, spring, and summer)   |                   |
| 51–52 | <b>Introduction to Philosophy</b> (3–3)  | Staff             |
|       | Readings from major philosophers and study of their philosophical positions in historical, social, and cultural context. Phil 51: Classical, medieval, and early modern philosophers: Socrates through Locke. Phil 52: Enlightenment, 19th-, and 20th-century philosophers: Locke through Sartre. Students are strongly encouraged to take Phil 51 before Phil 52. (Academic year) |                   |
| 111   | <b>History of Ancient Philosophy</b> (3)   | Schlagel          |
|       | History of Western philosophy from early Greece, including the Near East, with major emphasis on the Pre-Socratics, Socrates, Plato, and Aristotle. (Fall)   |                   |
| 112   | <b>History of Modern Philosophy</b> (3)  | Churchill         |
|       | History of Western philosophy of the 16th through 18th centuries; Continental Rationalism and British Empiricism from the scientific revolution through the Enlightenment; major emphasis on Montaigne, Descartes, Spinoza, Locke, Berkeley, Hume, and Kant.   |                   |
| 113   | <b>19th-Century Philosophy</b> (3)   | Altman            |
|       | European philosophy of the 19th century, with major emphasis on Kant, Hegel, Schopenhauer, Kierkegaard, and Nietzsche. (Spring)  |                   |
| 121   | <b>Symbolic Logic</b> (3)  | Griffith          |
|       | Formal evaluation of deductive arguments in politics, law, economics, etc. Additional topics: metatheory of deductive systems; modal logics; logic and computers. Prerequisite: Phil 45 or permission of instructor. (Spring)  |                   |



- 125 **Philosophy of Race and Gender** (3) Weiss  
An examination of race and gender as cultural distinctions that define personal and social identity. Readings from Beauvoir, Fanon, Foucault, Freud, and contemporary writers. (Fall)
- 127 **Theories of History and Society** (3) Altman  
Major philosophical accounts of the course of history and the origins of society, including Marxist theory and its critics. Problems of how we can explain the past and predict the future.
- 131 **Ethics: Theory and Applications** (3) Griffith, DeGrazia  
Main types of ethical theory: egoistic, utilitarian, self-realization, conscience, existentialism. Applications to contemporary problems. (Fall)
- 132 **Social and Political Philosophy** (3) Altman  
Philosophical theories about how economic, political, legal, and cultural institutions should be arranged. Topics include the meaning and significance of liberty, the legitimate functions of government, the nature of rights, the moral significance of social inequality, and the meaning of democracy. (Spring)
- 133 **Philosophy, Nonviolence, and War** (3) Churchill  
The course will consider one or more of following topics: philosophical foundations of pacifism and nonviolent resistance; philosophical inquiry into causes and prevention of war, aggression, genocide; logical and moral problems of nuclear deterrence and national defense, and the doctrine of just war. (Fall)
- 135 **Ethics in Business and the Professions** (3) Staff  
Basic concepts and theories of ethics for analysis of moral issues arising in business and professional practice. (Fall and spring)
- 142 **Philosophy of Law** (3) Altman  
Systematic examination of fundamental concepts of law and jurisprudence; special emphasis on the relationship between law and morality. (Fall)
- 151 **Science and the Modern World** (3) Schlagel  
Comparison of the cosmological frameworks of Aristotle, Newton, Einstein, and quantum mechanics. Emphasis on changing concepts and methodologies, modes of explanation, and ontological implications. (Fall)
- 152 **Knowledge and Reality** (3) Schlagel, DeGrazia  
Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, the role of language in knowledge, and the meaning and criteria of truth. Prerequisite: Phil 52 or 112 or permission of instructor. (Spring)
- 153 **Mind, Brain, and Artificial Intelligence** (3) Schlagel  
The mind-body problem in connection with developments in neurophysiology, cognitive psychology, and artificial intelligence. Evaluation of the major philosophical positions: dualism, epiphenomenalism, double-aspect theory, identity theory (reductive physicalism), eliminative materialism, and functionalism. (Spring)
- 161 **Philosophy and Literature** (3) Caws, Weiss  
Comparative study of the development of philosophical ideas from the existentialist tradition through narrative structure, character development, etc., in works of Kafka, Tolstoy, Mann, Woolf, Sexton, Stein, and others. (Spring)
- 162 **Aesthetics** (3) Weiss  
The problem of artistic representation and the nature of aesthetic experience as related to the creation, appreciation, and criticism of art. Special emphasis on nonrepresentational works of art and their interpretation. (Fall)
- 172 **American Philosophy** (3) Staff  
Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought.
- 192 **Analytical Philosophy** (3) DeGrazia  
The dominant movements of recent Anglo-American philosophy—logical positivism, British ordinary language philosophy, and neopragmatism—represented by Russell, G.E. Moore, Wittgenstein, Ryle, Ayer, Goodman, Quine, etc. Prerequisite: One other second-group philosophy course. (Fall)
- 193 **Phenomenology and Existentialism** (3) Caws, Weiss  
Kierkegaard's existentialist reaction to Hegel; subjectivity and intentionality in 19th-century thought, leading to Husserl's phenomenology; the philosophy of existence in Heidegger and Sartre; the relation between existentialism and Marx-

ism in the later work of Sartre. Prerequisite: One other second-group philosophy course. (Spring)

**198 Senior Seminar (3)**

Griffith, DeGrazia, Weiss

Intensive study of a contemporary philosophical problem or of the works of a major philosopher. Enrollment limited to philosophy majors in their senior year. (Spring)

**199 Readings and Research (3)**

Staff

(Fall and spring)

## PHYSICAL SCIENCE

See Chemistry.

## PHYSICS

Professors H.H. Hobbs, O. Bergmann, A.J. Zuchelli, D.R. Lehman (Chair), B.L. Berman, L.C. Maximon (Research)

Professorial Lecturers A. Ghovanlou, R. Eaton III

Associate Professors W.C. Parke, N.K. Khatcheressian, M.F. Taragin, E.P. Harper, W.J. Briscoe, J.R. Peverley, H. Haberzettl

Associate Professorial Lecturers M.T. Shams, J.T. Broach

Assistant Professors K.S. Dhuga, C. Bennhold, J.P. Connelly (Research)

*Bachelor of Arts with a major in physics*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Phys 13, 14, 15, 16 (or Phys 21, 5, 22, 6, and 16); Chem 11–12; Math 31, 32, 33.

3. Required courses in related area—CSci 100; Math 111–12.

4. Required courses in the major—Phys 151–52, 161, 162, 163, 164, 165–66, 167, 168, 195.

The B.A. curriculum is recommended for students who plan graduate study in physics or engineering.

*Bachelor of Science with a major in physics*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Phys 13, 14, 15, 16, (or Phys 21, 5, 22, 6, and 16); Chem 13; Math 31, 32, 33.

3. Required courses in related area—CSci 100 or equivalent.

4. Required courses in the major—Phys 151–52, 163, 161 or 164, 165–66, 167, 195 or 196. Recommended electives: Phys 162, 168, 170, 175; Math 111–12.

For graduation with Special Honors, a student must register for Phys 195 by the beginning of the senior year. The decision to award Special Honors will be based on competence in research and general achievement in physics as evaluated by the faculty.

*Minor in physics*—Required: Phys 13, 14, 15, 16 (or Phys 21, 5, 22, 6, and 16); Phys 163 and 164 or approved substitutes from 100-level physics courses.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**1 General Physics I (3)**

Maximon

Lecture (2 hours), recitation (1 hour). Development of the principles of classical physics. Translational motion, force, gravitation, equilibrium, momentum, work, energy, thermodynamics, waves, periodic motion, sound, fluids, solids, light, and geometrical optics. Prerequisite: Math 6 or equivalent. Concurrent registration in Phys 5 is strongly recommended.

**2 General Physics II (3)**

Zuchelli

Lecture (2 hours), recitation (1 hour). Continuation of Phys 1. Topics include electrostatics, electromagnetism, electronic circuits, electromagnetic radiation, relativity, quantum theory, and atomic and nuclear structure. Prerequisite: Phys 1 or equivalent. Concurrent registration in Phys 6 is strongly recommended.



- 5 General Physics Laboratory I (1)** Zuchelli  
Laboratory complement of Phys 1 and 21. Two and a half hours. Prerequisite: concurrent or prior registration in Phys 1 or concurrent registration in Phys 21. Laboratory fee, \$40.
- 6 General Physics Laboratory II (1)** Briscoe  
Laboratory complement of Phys 2 and 22. Two and a half hours. Prerequisite: concurrent or prior registration in Phys 2 or concurrent registration in Phys 22. Laboratory fee, \$40.
- 9 Introduction to Astronomy I (3)** Parke  
Classical through modern astronomy, with introduction to basic principles underlying astronomical systems and observations. Lectures cover electromagnetic radiation, optical instruments, and the solar system. Laboratory (2 hours) emphasizes optics and astronomical measurements. Prerequisite: High school algebra. Laboratory fee, \$30. (Fall)
- 10 Introduction to Astronomy II (3)** Parke  
Stellar and extragalactic astronomy, including introduction to quantum aspects of electromagnetic radiation and atomic physics, stellar spectra, and stellar evolution. Essential material from Phys 9 included. Laboratory (2 hours) has the same emphasis as in Phys 9. Prerequisite: High school algebra. Laboratory fee, \$30. (Spring)
- 11-12 Introduction to Astronomy (2-2)** Parke  
Same as Phys 9-10 without the laboratory. (Academic year)
- 13 General Physics for Engineering and Applied Science (3)** Berman  
Lecture (3 hours), recitation and laboratory (2 hours). Development of basic principles of optics and dynamics. Topics include geometrical optics, vector algebra, statics of rigid bodies, single-particle kinematics and dynamics, conservation of energy. Concurrent registration in Math 31 is required. Laboratory fee, \$40.
- 14 Mechanics and Thermal Physics (3)** Briscoe  
Lecture (3 hours), recitation and laboratory (2 hours). Elementary development of mechanics for many-particle systems and basic thermodynamics. Topics include collisions, rotational motion, small vibrations, gravitation, fluid dynamics, wave motion, the ideal gas, the laws of thermodynamics, thermal properties of solids and liquids. Prerequisite: Phys 13; Math 31. Laboratory fee, \$40.
- 15 Electricity and Magnetism (3)** Haberzettl  
Lecture (3 hours), recitation and laboratory (2 hours). Introductory aspects of electromagnetic theory. Topics include static electric fields, Coulomb's Law, Gauss's Law, electrical potential, capacitance and dielectrics, electric current and resistance, Ampere's Law, Faraday's Law, Maxwell's equations in integral form, electromagnetic waves. Prerequisite: Phys 14; Math 31. Laboratory fee, \$40.
- 16 Modern Physics (3)** Lehman  
Lecture (3 hours), recitation and laboratory (2 hours). Basic principles of special relativity and quantum theory. Relativistic kinematics and dynamics, wave-particle duality, the hydrogen atom, atomic physics, the atomic nucleus, nuclear reactions, statistical distribution laws, applications to molecular and solid-state physics. Prerequisite: Phys 15; Math 32. Laboratory fee, \$40.
- 21 University Physics I (3)** Dhuga  
Lecture (2 hours), recitation (1 hour). Physical concepts and principles are developed using calculus. Topics include classical mechanics, heat, waves, and optics. Concurrent registration in Phys 5 is required. Prerequisite or concurrent registration: Math 31. (Fall)
- 22 University Physics II (3)** Dhuga  
Lecture (2 hours), recitation (1 hour). Continuation of Phys 21. Topics include electric and magnetic phenomena, relativity, atomic and nuclear physics. Concurrent registration in Phys 6 is required. Prerequisite: Phys 21; prerequisite or concurrent registration: Math 32. (Spring)
- 121 Modern Cosmology (3)** Parke  
Nonmathematical treatment of cosmology and related subjects from astronomy and physics. Quasars, peculiar galaxies, pulsars, black holes, antimatter, etc. Prerequisite: Phys 9 and 10, or 11 and 12.
- 151-52 Intermediate Laboratory (2-3)** Dhuga  
Independent advanced work to introduce students to research techniques and use of specialized instruments. Laboratory fee, \$30. (Fall and spring)

- 161 Mechanics I (3)** Khatcheressian  
Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations.
- 162 Mechanics II (3)** Bergmann, Khatcheressian  
Basic aspect of continua, including elasticity and fluid dynamics, strain tensor, stress tensor, equations of equilibrium, elastic waves, ideal and viscous fluids.
- 163 Physical and Quantum Optics (4)** Peverley  
Lecture (3 hours), laboratory (3 hours). Wave motion, electromagnetic aspects of light, dispersion of light in media, geometrical optics, polarization and optical properties of crystals, interference, diffraction, lasers, holography. Mathematical tools, including Fourier methods, developed as needed. The quantum description of light complements the classical description. Laboratory fee, \$35.
- 164 Thermodynamics (3)** Parke  
Principles and applications of equilibrium thermodynamics, reversible processes, thermodynamic potentials, stability and phase changes.
- 165-66 Electromagnetic Theory (3-3)** Zuchelli  
Development of Maxwell's field equations using vector and tensor calculus, electrostatics, stationary and nonstationary phenomena, basic circuit theory, electromagnetic waves and radiation.
- 167 Principles of Quantum Physics (3)** Harper  
Development of logical structure and experimental bases for modern quantum mechanics. Simple examples worked out to clarify the structure; primary emphasis on conceptual framework and its mathematical realization; careful consideration of the laboratory results to which the theory is a response.
- 168 Applied Quantum Physics (3)** Harper, Khatcheressian  
Explicit applications of principles of quantum mechanics to a variety of problems in atomic, molecular, and nuclear physics. Quantum statistical mechanics developed with applications in solid state. Emphasis on explicit evaluation of solutions and the techniques required. Prerequisite: Phys 167 or equivalent.
- 170 Elementary Solid-State Physics (3)** Peverley  
Structure of solids, lattices and lattice defects, deformation, vibrational and electronic contribution to specific heats, binding energies, electronic states in metals and semiconductors, magnetic properties of solids. Elementary methods required such as quantum mechanics and normal mode expansions are developed as needed.
- 175 Nuclear Physics (3)** Berman, Lehman  
Introduction to application of quantum physics in the description of nuclei and their interactions. Properties of nuclei, nuclear models, nuclear forces, and nuclear reactions are considered. Specific topics include the deuteron, n-p scattering, the optical model, the shell model, the liquid-drop model, beta decay, fission, and fusion. Prerequisite: Phys 167 or permission of instructor.
- 195-96 Undergraduate Research (3-3)** Briscoe, Lehman  
Research on problems approved by the staff. For the B.A. option, emphasis will be placed on advanced laboratory experience. For the B.S. option, the two semesters will involve advanced laboratory experience and applications of computers in the solution of physics problems, respectively.

## POLITICAL COMMUNICATION

See Communication Studies.

## POLITICAL SCIENCE

University Professor J.N. Rosenau

Professors B.M. Sapin, J.A. Morgan, Jr., B. Reich, Y.C. Kim, J.M. Logsdon, W.H. Lewis, C.A. Linden, H.R. Nau, M.A. East, J.B. Manheim, C. McClintock, P. Reddaway, J. Post (Research), J.R. Henig, C.C. Joyner, L. Sigelman (Chair), M.J. Sodaro, S.L. Wolchik, J.R. Wright

Associate Professors C.F. Elliott, R.W. Rycroft, C.J. Deering, H.B. Feigenbaum, J.H. Lebovic,

R.P. Stoker, N.J. Brown

Assistant Professors S.L. Wiley, J. Mitchell, S.K. Sell, C. Burack, M. Finnemore, F. Maltzman



**Bachelor of Arts with a major in political science**—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite: PSc 1 and 2 (or the equivalent). Six courses in the social sciences, other than political science, to include 6 hours of history or 6 hours of economics. Twelve credit hours of introductory foreign language and statistics are strongly recommended.

3. Required courses in the major: 30 credit hours of 100-level political science courses, including a distribution requirement that consists of 6 credit hours from each of the following groups: Group A (political theory and methodology)—PSc 101, 102, 104, 105, 106, 107, 108, 110; Group B (American government and politics)—PSc 111, 112, 114, 115, 116, 117, 118, 119, 120, 122, 124, 129; Group C (comparative government and politics)—PSc 130, 131, 146, 168, 170, 173, 177, 179, 180, 181, 183; Group D (international politics, law, and organizations)—PSc 140, 142, 144, 149, 161, 175, 176, 178, 182, 184.

Of the courses in Group A at least one must be PSc 101, 102, or 104, and it is recommended that this course be taken as early in the student's academic program as possible.

Every major must complete a proseminar or, if eligible, the Honors Seminar (PSc 199) in the junior or senior year. A maximum of two of these may be included in a student's program; such courses do not satisfy the department's group distribution requirements. A 200-level course may be substituted for the proseminar requirement with the written permission of the instructor and the undergraduate coordinator.

The department also offers a major with a public policy focus. Students who wish to concentrate in public policy must distribute their 30 hours in political science as follows: PSc 104; 9 credit hours in policy-oriented courses to be selected from PSc 112, 117, 122, 124, 146; one policy-oriented proseminar; 3 additional credit hours from each of Groups A, B, C, D; and 3 credit hours in a political science elective at the 100 level.

Up to 12 hours of either service-learning or internship credit may be applied toward a degree. No more than 3 hours of such courses may be credited toward the major; these courses do not satisfy the distribution requirement.

Students may apply for graduation with Special Honors. To qualify, the student must fulfill the general requirements stated under University Regulations and take PSc 199, Honors Seminar, in which an independent study project is completed with distinction. The student must complete the seminar before the final semester of course work. The project is evaluated by a Departmental Honors Committee, which can recommend graduation with Special Honors in political science. To be eligible for enrollment in an honors seminar, students must be political science majors, have successfully completed PSc 101, have achieved a grade-point average in the major of at least 3.3, and be juniors or seniors.

**Minor in political science**—Required: PSc 1 and 2 (or the equivalent) plus 15 credit hours of 100-level political science courses, including a distribution requirement of one course from each of the four groups listed in item 3 above. A minimum of 9 credit hours of other social science courses is also required.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Departmental prerequisite:** PSc 1 and 2 (or the equivalent) are prerequisite to all 100-level courses in political science.

**1 Introduction to Comparative and International Politics (3)**

Sodaro, Feigenbaum, Brown

Comparative and international political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. (Fall and spring)

**2 Introduction to American Politics and Government (3)**

Rycroft, Deering, Sigelman, Maltzman

Structure, powers, and processes of the American political system and the impact on public policy. (Fall and spring)

**3-4 Introduction to Political Behavior (6-6)**

Staff

Role of personal and social values in political behavior. Fall: Focus on problems in the American liberal tradition. Spring: A comparative perspective on democratic and authoritarian governments in the 20th century. Admission by special selection process. (Academic year)

- 50 **Washington, D.C.: History, Culture, and Politics** (3) Gillette  
Same as AmCv/Hist 50.
- 101 **Scope and Methods of Political Science** (3) Kim, Lebovic, Stoker, Wiley, Sigelman  
Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. Laboratory fee, \$20. (Fall and spring)
- 102 **Empirical Political Analysis** (3) Wiley  
Extensive examination of empirical research methods in the analysis of political behavior. Research design, data collection (survey and aggregate), and data analysis. Prerequisite: PSc 101 or permission of instructor. (Spring)
- 104 **Methods of Public Policy Analysis** (3) Henig, Stoker  
Introductory overview of the concepts, issues, and techniques of systematic policy analysis and its role in the policy process. (Fall and spring)
- 105 **Political Theory: Major Issues of Western Political Thought I** (3) Linden, Mitchell  
Foundations of Western political thought—Plato to Aquinas. (Fall)
- 106 **Political Theory: Major Issues of Western Political Thought II** (3) Linden, Mitchell  
Theoretical roots of modern political order and disorder—Machiavelli to Rousseau. (Spring)
- 107 **Issues in Modern Political Thought** (3) Linden, Mitchell  
Issues of modern political thought as seen through major representative thinkers. Emphasis on conservative, liberal, and radical thought. (Fall and spring)
- 108 **Marxism-Leninism** (3) Elliott  
Intensive study of theories and philosophical assumptions of modern communism. Emphasis on Marx, Engels, and Lenin, and consideration of Bernstein, Rosa Luxemburg, Lukacs, Trotsky, Stalin, Khrushchev, and Gorbachev. (Spring)
- 110 **American Political Thought** (3) Morgan, Mitchell  
Political thought in the U.S. from colonial times to the present as seen through major representative writings. (Spring)
- 111 **State and Urban Politics** (3) Henig  
Comparative analysis of context, institutions, processes, and policies of state and urban political systems. (Fall)
- 112 **State and Urban Policy Problems** (3) Henig  
Selected issues in state and urban policy-making, with emphasis on urban and metropolitan settings. (Spring)
- 114 **U.S. Constitutional Law and Politics I** (3) Morgan  
Separation of powers, federal-state relationships, economic regulation. (Fall)
- 115 **U.S. Constitutional Law and Politics II** (3) Morgan  
Political and civil rights. (Spring)
- 116 **The American Presidency** (3) Maltzman  
Examination of the politics of presidential selection, the authority of the contemporary institution, the mechanisms and processes for formulating public policy, and the influences of personality on performance in office. (Fall and spring)
- 117 **Public Administration and Bureaucratic Politics** (3) Rycroft  
Basic concepts in public administration; influence of bureaucratic politics on policy formulation and implementation. (Fall)
- 118 **Legislative Politics** (3) Deering, Wright, Maltzman  
Theory, structure, and process of the U.S. Congress, with emphasis on elections, party organization, committees, and floor procedure, in the context of executive-legislative relations and interest-group activities. (Fall and spring)
- 119 **U.S. Political Parties and Politics** (3) Wright  
Role of parties as a linkage between mass preferences and government policies. Organization, nominations, voting, and activities in legislative and executive branches. (Fall and spring)
- 120 **Public Opinion and Political Socialization** (3) Wiley, Sigelman  
Sources of mass political attitudes and behavior; voting and political campaigning. (Fall)
- 122 **Science, Technology, and Politics** (3) Logsdon, Rycroft  
Multiple impacts of scientific and technological developments on the political systems. Discussion of public policies for support, use, and control of science and technology. (Fall and spring)



- 124 Issues in Domestic Public Policy (3)** Deering, Stoker  
Examination of the decision-making process and the substance of various issues in domestic public policy in such areas as crime, economics, education, energy, the environment, poverty, and health. (Fall and spring)
- 128 Governmental Processes and the News Media (3)** Staff  
Same as Jour 128.
- 129 Television and Politics (3)** Staff  
Examination of the impact of television on American politics and society, the nature of coverage of political issues and campaigns, the dynamics of selecting and presenting news stories. Same as Jour/Comm 129. (Fall and spring)
- 130 Comparative Government and Politics I (3)** Feigenbaum  
Comparative political analysis with primary focus on the principal states of Western Europe. (Fall and spring)
- 131 Comparative Government and Politics II (3)** Sodaro, Wolchik  
Government and politics of the communist nations; emphasis on the Soviet Union and countries of Eastern Europe. (Fall and spring)
- 140 International Politics (3)** Sodaro, Lebovic, Sell, Finnemore  
International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy. (Fall and spring)
- 142 International Organizations (3)** Finnemore  
Development and operations of the United Nations, regional organizations, and functional international organizations. (Fall and spring)
- 144 Public International Law (3)** Joyner  
Survey of international law, with emphasis upon law's conceptual development and practical application to contemporary international issues. (Fall and spring)
- 146 U.S. Foreign Policy (3)** Sapin  
Constitutional, political, and international factors that determine the formulation, execution, and substance of U.S. foreign policy. (Fall and spring)
- 149 Military Force and Foreign Policy (3)** Sapin, Lewis  
Impact of military considerations on U.S. foreign policy; major problems in national security, e.g., strategic weaponry, military assistance, regional security problems. (Fall and spring)
- 161 European-Atlantic Relations (3)** Staff  
International politics of the North Atlantic area, the European Common Market, and U.S.-European relations. (Fall)
- 168 Post-Soviet Foreign Policy (3)** Elliott  
External problems and policies of Russia and the other successor states of the former USSR (especially the Baltics, Ukraine, and southern rim of the former Soviet Union). (Fall)
- 170 Governments and Politics of China and Northeast Asia (3)** Staff  
Political institutions and processes of China (including Taiwan), Japan, and Korea since World War II. Influence of indigenous traditions and foreign contacts. (Fall, even years)
- 173 Governments and Politics of South and Southeast Asia (3)** Staff  
Interaction of traditional, colonial, and contemporary influences in the domestic and international politics of the Indian subcontinent and of mainland and insular southeast Asia. (Fall, odd years)
- 175 International Relations of East Asia (3)** Kim  
Analysis of the foreign policies of selected East Asian countries and the foreign policies of major powers toward the region. (Fall)
- 176 The Arab-Israeli Conflict (3)** Reich  
Origins, evolution, and issues of the Arab-Israeli conflict. (Spring and summer)
- 177 Governments and Politics of the Middle East (3)** Reich, Brown  
Politics of the eastern Arab states, Turkey, Iran, and Israel. (Fall)
- 178 International Relations of the Middle East (3)** Reich, Brown  
Analysis of the regional and international relations of the Middle East. (Spring)
- 179 Israeli Politics and Foreign Policy (3)** Reich  
Examination of the institutions, processes, and issues of Israeli politics and foreign policy. (Fall)

- 180 Governments and Politics of North Africa (3)** Lewis  
Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East. (Spring)
- 181 Politics of Middle and Southern Africa (3)** Staff  
Comparative analysis of political systems in selected countries of non-Mediterranean Africa. (Fall)
- 182 African International Politics (3)** Staff  
Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended prerequisite: PSc 181. (Spring)
- 183 Governments and Politics of Latin America (3)** McClintock  
Political processes and institutions of selected countries in South America, Central America, and the Caribbean. Emphasis on the possibilities for democracy and revolution. (Fall)
- 184 International Relations of Latin America (3)** McClintock  
U.S.-Latin American relations and foreign policies of selected states. (Spring)
- 187 Internship (3)** Staff  
Study of political behavior through internship experience with Congress, executive departments or agencies, politically active private-sector groups, political parties, or electoral campaigns. Admission requires departmental approval. (Fall and spring)
- 190 Selected Topics (3)** Staff  
(Fall and spring)
- 192 Proseminar (3)** Staff  
Examination of selected problems in political science. Admission requires departmental approval. (Fall and spring)
- 199 Honors Seminar (3)** Staff  
Research on selected topics. Admission requires departmental approval. Prerequisite: PSc 101.

## PORTUGUESE

See Romance Languages and Literatures.

## PSYCHOLOGY

Professors J.N. Mosél (Emeritus), R.D. Walk (Emeritus), A.D. Kirsch, V. Kirkbride (Emeritus), D.E. Silber (Chair), C.E. Rice, E. Abravanel, J. Miller, L.A. Rothblat, R.A. Peterson, J. Zeidner (Research), R.D. Caplan, P. Wirtz, J. Post (Research), D. Reiss, S.A. Karp, C.K. Sigelman

Associate Professors R.W. Holmstrom, P.J. Poppen, L. Brandt, L.R. Offermann, C.A. Rohrbeck, F.Z. Belgrave

Assistant Professors M.L. Jasnoski, C.E. Sager, M.C. Zoa, J.C. Rivero, S. Dopkins, J.M. Ganiban

Assistant Professorial Lecturer C.M. Carney, K. Ross-Kidder

Lecturer P.J. Woodruff

*Bachelor of Arts with a major in psychology*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite course—Psyc 1.

3. Required courses in related areas:

(a) Stat 53 or equivalent. Students are encouraged to take a second statistics course to meet the general curriculum requirement in quantitative and/or logical reasoning.

(b) 9 credit hours selected from American civilization, anthropology, economics, geography and regional science, history, philosophy (Phil 113, 151, or 152 recommended), political science, or sociology, of which 6 hours must be from anthropology, economics, history, political science, or sociology. If a student takes more than 6 hours in any one department, the excess will be credited to electives.

4. Required courses in the major—Three survey courses (Psyc 11, 12, 13); 25 credit hours in 100-level psychology courses, including principles and methods of research (Psyc



105 or 106); experimental (Psyc 118 or 121); history and systems (Psyc 196); and five additional 100-level courses.

It is recommended that students contact their academic advisors as soon as possible for assistance in planning their programs of study.

To qualify for graduation with Special Honors the student must fulfill the general requirements stated under Regulations, take an honors seminar (Psyc 197) or a 200-level seminar, and complete an independent study project (Psyc 191 or 198) with distinction. The grade-point average in psychology required for graduation with Special Honors is 3.3.

*Five-Year Bachelor of Arts/Master of Arts in the field of art therapy*—A program leading to the B.A. in the field of fine arts or psychology and the M.A. in the field of art therapy. The program is described under the Department of Art.

*Minor in psychology*—18 credit hours are required, including Psyc 1, 11, 12, 13, and at least two 100-level psychology courses. Students considering graduate study in psychology are advised to take Psyc 105 or 106, a distribution of courses from the categories listed under the major above, Psyc 196, and an elementary course in statistics.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

- |  |                                  |
|--|----------------------------------|
| <b>1 General Psychology (3)</b>  | Staff                            |
| Fundamental principles underlying human behavior. (Fall and spring)  |                                  |
| <b>11 Abnormal Psychology (3)</b>  | Holmstrom, Rohrbeck, Silber, Zee |
| Causes, diagnosis, treatment, and theories of various types of maladjustments and mental disorders. (Fall and spring)  |                                  |
| <b>12 Social Psychology (3)</b>  | Belgrave, Sager                  |
| Social foundations of behavior: cognition, motivation, role behavior, communication, small-group processes, and attitudes. (Fall and spring)   |                                  |
| <b>13 Psychology of Childhood (3)</b>  | Brandt, Rohrbeck, Sigelman       |
| Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world.  |                                  |
| <b>22 Introduction to Educational Psychology (3)</b>   | Kirkbride                        |
| The contributions of psychology to education; emphasis on learning. Includes fieldwork. (Spring)   |                                  |
| <b>104 Ecology and Mental Health (3)</b>   | Karp                             |
| Examination by field research of the linkages between aspects of the physical environment and mental health. Tutorials, conferences, and student field research projects. (Fall)   |                                  |
| <b>105-6 Principles and Methods of Psychology (4-4)</b>  | Dopkins and Staff                |
| Lecture (3 hours), laboratory (3 hours). An experimental approach to understanding behavior; individual and class experiments performed. Psyc 105: sensation, perception, and emotions and their relation to adaptive behavior. Psyc 106: memory, human information processing, learning, and motivation. Laboratory fee, \$30 per semester. (Academic year) |                                  |
| <b>108 Humanistic Psychology (3)</b>   | Staff                            |
| Critical examination of humanistic psychology. Emphasis on role of consciousness in human behavior. Philosophic foundations, existential, phenomenological, and transpersonal psychology. (Spring)   |                                  |
| <b>110 Perception and Understanding in Children (3)</b>  | Abravanel                        |
| Concepts and research in the area of developmental psychology; emphasis on the growth and development of thinking, perceiving, and symbolic activity. (Spring)   |                                  |
| <b>112 Psychology of Adolescence (3)</b>   | Ross-Kidder                      |
| Psychological characteristics and problems peculiar to adolescence, with emphasis on application of psychology to solution of such problems. (Fall or spring)  |                                  |
| <b>115 Psychology of Language and Communication (3)</b>  | Staff                            |
| Introduction to psycholinguistics and verbal behavior. Information theory, generative grammar theory, cultural and linguistic structures in perception and neuro-linguistics programming. (Fall)   |                                  |

- 118 **Neuropsychology (3)** Rothblat  
Analysis of neural processes underlying behavior. Basic structure and functions of the nervous system, with emphasis on sensory processes, learning and memory, motivation, and emotion. (Fall and spring)
- 119 **Group Dynamics (3)** Miller  
Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes, emphasizing contributions of Freud, Bion, Slater, Miller and Rice. Opportunity is provided to attend a group dynamics workshop, which is recommended but not required. Enrollment limited. (Spring)
- 121 **Memory and Cognition (3)** Staff  
An examination of the psychological processes underlying human memory and cognition. Topics cover theoretical and experimental issues involving a range of cognitive function from attention and pattern recognition to learning and memory. (Fall)
- 122 **Psychology and Human Relations (3)** Silber  
Understanding human relations and T-group techniques by evolving an ongoing T-group within the course itself. For junior and senior undergraduate social science majors; open to others with permission of instructor. (Summer)
- 128 **Health Psychology (3)** Jasnoski, Belgrave, Peterson, Poppen  
Current research in the area of health psychology, with special attention to psychological factors related to health and illness, psychological intervention with medical patients, and psychological approaches to illness prevention and health promotion.
- 129 **Theories of Personality (3)** Poppen, Rice, Jasnoski  
Survey of personality theories; emphasis on their application to problems of individuals. (Fall and spring)
- 130 **Seminar: Political and Social Implications of Current Approaches to Psychological Treatment (3)** Karp  
Presentation and discussion of recent work, such as that of Szasz and Goffman, bearing upon the implications for individuals and society of various approaches to psychological treatment, including psychotherapy and behavior modification.
- 131 **Psychological Tests (3)** Holmstrom, Karp  
Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, \$25. (Fall and spring)
- 132 **Socialization in Childhood (3)** Brandt  
Examination of primary methods by which the child is shaped in terms of social judgment and self-control; internalization of controls, assimilation of societal values and parenting procedures. Organized by focus on issues according to developmental level.
- 135 **Freud and Modern Psychoanalysis (3)** Miller  
Introduction to the work of Freud and his impact on modern psychoanalysis, focusing on the meaning of dreams and the unconscious function of conflict and defense, infantile sexuality and the Oedipus conflict, development of the ego, theory of anxiety and neurosis, and the death instinct. (Spring)
- 144 **Industrial/Organizational Psychology (3)** Offermann, Caplan, Rivero  
Psychological concepts and methods applied to problems of personnel management, employee motivation and productivity, supervisory leadership, and organizational development. (Fall and spring)
- 150 **Psychology of Sex Differences (3)** Poppen  
Relevant biological, psychological, and sociological influences on males and females in the development of sex differences; hormonal differences, gender identity, differential socialization of sons and daughters, masculinity/femininity, cultural evaluation of male and female roles. Survey of relevant psychological theory. Emphasis on empirical research and hypothesis testing. (Spring)
- 154 **Psychology of Crime and Violence (3)** Silber  
Examination of many psychological aspects of criminal behavior; personality of criminals and of psychological processes affecting behavior. (Spring)
- 156 **Psychology of Attitudes and Public Opinion (3)** Carney  
Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare.



- 170 Clinical Psychology (3)** Zea, Peterson  
An exploration of the history, functions, and problems of the clinical psychologist. Assessment, treatment, community approaches, ethics. Prerequisite: Psyc 11, 131.
- 188 Attitudes Toward Death and Dying (3)** Woodruff  
Exploration of the many different aspects, attitudes, and experiences associated with the process of death and dying. Limited to juniors and seniors.
- 191 Independent Research (3)** Staff  
Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)
- 192 Field Experience (3)** Abravanel  
Senior psychology majors will spend a minimum of six hours a week in a local mental health, rehabilitation, school, or community setting. Students registering for this course must have blocks of time available in their class schedules. (Fall and spring)
- 193 Seminar in Industrial/Organizational Psychology (3)** Staff  
Selected specialized topics in the field of psychology and work behavior, such as human ability and personality, decisions and risk behavior, organizational change, and leadership. May be repeated for credit. Prerequisite: Psyc 144 or permission of instructor.
- 196 History and Systems of Psychology (3)** Rice, Holmstrom  
Senior capstone course that includes a survey and integration of the major viewpoints and concepts of psychology. Required of psychology majors. (Fall and spring)
- 197 Honors Seminar (3)** Staff  
Selected topics in psychology that change from semester to semester. Intended primarily for juniors who plan to enroll in Psyc 191 in the senior year and for students in the Special Honors program in psychology. May be repeated for credit.
- 198 Current Research Issues (3)** Staff  
Conducted as a seminar. Recent experiments in psychology, including those performed by members of the class; emphasis on student participation. May be repeated for credit.

#### **PUBLIC ADMINISTRATION**

Programs in public administration are offered at the graduate level by the School of Business and Public Management. The course listed here is open to interested undergraduates.

- 125 Managing Public Policy (3)** Staff  
Contemporary concepts and issues in public administration and management. Major trends and approaches to governmental administration in the U.S., including the changing federal role, roles of the public sector in relation to the private sector, and managing public agencies at all levels. (Fall and spring)

#### **RADIO-TELEVISION**

See Communication Studies.

#### **RELIGION**

University Professor S.H. Nasr  
Professors H.E. Yeide, Jr., D.D. Wallace, Jr. (Chair), A.J. Hildebeitel  
Associate Professor S.A. Quitslund  
Associate Professorial Lecturer E.S. Jospe  
Assistant Professors R.J. Eisen, P.B. Duff  
Assistant Professorial Lecturer A. Ziffren

*Bachelor of Arts with a major in religion*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. **Prerequisite courses**—Rel 1, 2.

3. Four required courses in related areas—(a) 6 credit hours in studies of cultures other than American and English (preferably a foreign language), and (b) 6 credit hours in either literature, philosophy, or history.

4. Required courses in the major—30 credit hours, including at least 21 hours of upper-level courses. Twelve of these hours must be chosen from one of the following religious traditions: Christianity, Hinduism, Islam, and Judaism. Appropriate graduate seminars may be approved as substitutions for advanced-level courses. The program must include Rel 101 and at least one course each in Hebrew Scriptures and in New Testament.

Special Honors are awarded to students who meet the requirements stated under University Regulations and who complete an honors thesis by enrolling in Rel 191.

It is recommended that students include the study of foreign languages in their undergraduate program, including a language crucial to one of the religious traditions. All students expecting to enter graduate school are urged to study French or German.

*Minor in religion*—Required: a minimum of 18 credit hours in religion, of which at least 6 must be upper-level courses. The minor program will be developed in consultation with the departmental advisor. Rel 101 is strongly recommended for all participating students.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**1 Introduction to World Religions: West (3)**

Staff

Examination of the religions of the ancient Mediterranean and the major religions of the West. Religious foundations of Western civilizations. The development of Judaism, Christianity, and Islam and their confrontations with secularization and political upheaval in the modern world. (Fall and spring)

**2 Introduction to World Religions: East (3)**

Staff

Examination of the major religions of the East and comparison with religions in the West. Approaches to the cross-cultural study of religion. Hinduism, Buddhism, and the religions of Tibet, China, and Japan are studied with respect to their history and their encounter with modernity. (Fall and spring)

**9 The Hebrew Scriptures (3)**

Duff

The literature, history, and religious thought represented by the Hebrew Scriptures (Old Testament). Continuities and contrasts between Israel and the ancient Near East are considered through study of the world view, oral and literary tradition, main religious ideas, and chief figures and movements of the biblical literature. (Fall and spring)

**10 The New Testament (3)**

Duff

Literature and history of earliest Christianity in the setting of the religious movements of the Greco-Roman world and developments within Judaism. The meaning of the earliest Christian proclamation about the significance of the life, teaching, and death of Jesus of Nazareth becomes the basis for tracing the formation and expansion of the Christian movement. (Fall and spring)

**23 Introduction to Judaism (3)**

Eisen

A survey of Jewish thought and practice from the biblical to the modern period; introduction to the Hebrew Bible, rabbinic Judaism, Jewish philosophy and mysticism, Judaism in the modern period; an examination of the central rituals in Judaism, including Sabbath, dietary laws, and major festivals. (Fall and spring)

**101 Theories in the Study of Religion (3)**

Ziffren

Seminar taught jointly by the faculty of the Department of Religion. Analysis of different ways in which religious phenomena can be approached. Readings and discussion of some of the epoch-making books in the development of the study of religion.

**103 The Prophets (3)**

Quitslund

Development of the prophetic movement in Israel; cultural, economic, literary, and religious dimensions; elements of lasting value in the prophetic teaching. Study of selected prophets.



- 104 The Life and Thought of Jesus (3)** Quitslund  
Comprehensive study of the life and teachings of Jesus with critical attention to sources. Quest for the historical Jesus.
- 105 The Life and Thought of Paul (3)** Quitslund  
Backgrounds of early Christianity, first-century religious and social conditions affecting the spread of Christianity, the life and journeys of Paul, Paul's presentation of the Christian faith.
- 107 Rabbinic Thought and Literature (3)** Eisen  
An examination of the thought and literature of rabbinic Judaism in its formative period, 100–500 CE, through a close reading of primary texts in translation; the development of early rabbinic law and theology is explored in the Mishnah, Talmud, and Midrash.
- 111 Myth, Epic, and Novel (3)** Hiltebeitel  
Religious themes and images of the hero and their cultural significance in literature: e.g., Indo-European, Biblical, Babylonian narrative traditions; Greek epic and drama; Dante, Milton, Dostoevsky, Kafka, Hesse, Faulkner, Beckett.
- 112 Jewish Mysticism (3)** Eisen  
A historical treatment of the major forms of Jewish mysticism: the ecstatic schools of Merkavah mysticism, medieval German pietism, and Abraham Abulafia; the theosophic mysticism of medieval French and Spanish Kabbalah, Lurianic Kabbalah, and modern Hasidism; examination of major Jewish concepts, such as God, man, Israel, Torah, and redemption, as understood by these schools.
- 113 Early Post-Biblical Judaism (3)** Duff  
History of Judaism from the time of Ezra through the destruction of Jerusalem in 70 CE—canonization of the Pentateuch, Hellenism, Maccabean revolt, growth of sectarian movements, Herod, ferment against Rome in context of Eastern and Western political currents. Use of primary sources, especially the Bible, Josephus, and rabbinic and noncanonical writings.
- 115 Jewish Philosophy in the Medieval Period (3)** Eisen  
An exploration of Jewish philosophical thinking from the close of the rabbinic period to the end of the Middle Ages through an analysis of four major philosophers—Saadia, Judah Halevi, Maimonides, and Gersonides. Topics include the nature of God, creation, divine providence, prophecy, and the rationale for the biblical commandments.
- 116 Judaism After Emancipation (3)** Jospe  
Transformation of community and beliefs among Jews beginning with catalyst of their political emancipation. Responses to beginnings of modernity among Jews in Europe, America, and Israel.
- 121 Ethics and the World Religions (3)** Yeide  
Modern concepts of ethics and their relation to major world religions; religion as stimulus and barrier to moral change; modern moral issues and religious ethics.
- 122 Christian Ethics and Modern Society (3)** Yeide  
Nature and principles of Christian life as developed by the Christian community; problems of personal conduct; application to various social institutions.
- 123 Issues in Jewish Ethics (3)** Eisen  
Exploration of current debates about major ethical issues among Jewish thinkers in the Orthodox, Conservative, and Reform denominations; issues in bioethics, feminism, attitudes towards non-Jews, social action, the ethics of war.
- 124 Contemporary Movements in Theology (3)** Quitslund  
Theological approach and systems of a selected number of modern theologians and/or theological movements such as process theology, liberation theology.
- 126 Christian Mysticism (3)** Quitslund  
Study of the phenomenon of religious experience and of selected mystics.
- 127 Medicine, Religion, and Healing (1)** Yeide  
Total care concept. Importance of religion in medical practice for patient and physician. Concept of the professional, the clergy's role in healing, religious perspective on issues in medical ethics.
- 134 The Holocaust in Theology and Literature (3)** Eisen, Ticktin  
Theological and literary reactions of Jewish thinkers to the Holocaust; emphasis on evaluating contemporary responses to the Holocaust in light of attitudes

- toward suffering in the classical Jewish tradition; readings include Fackenheim, Rubinstein, Wiesel, and Appelfeld.
- 143 **Christianity in the Ancient World** (3) Wallace  
Rise and development of Christianity in relation to the culture, philosophy, mystery religions, and general religious life of the Greco-Roman world to A.D. 500.
- 144 **Medieval Faith and Symbolism** (3) Wallace  
Christian life and thought in the Middle Ages; mystics, saints, popes, and philosophers.
- 145 **Religion in the Renaissance and Reformation** (3) Wallace  
Transformation of the Western understanding of human identity and destiny from the end of the Middle Ages to the Age of Reason.
- 146 **Christianity in the Modern World** (3) Wallace  
Changes in Christian life and thought since 1700, as seen in theology, literature, political life, and religious institutions.
- 155 **Religion, Myth, and Magic** (3) Simons, Wagner  
Same as Anth 155.
- 157 **Indian Philosophy and Mysticism** (3) Hiltebeitel  
Indian speculative and mystical traditions; late Vedas, Upanishads, Bhagavad Gita, Buddhist, and Hindu soteriological systems.
- 158 **Hinduism** (3) Hiltebeitel  
Study of continuity and change in Hinduism, with emphasis on historical development and the consolidating features of the religion. Attention to relations between classical and popular living forms.
- 159 **Mythologies of India** (3) Hiltebeitel  
The lore of Indian gods (Vedic, Puranic), heroes (epics), and holy men (Hindu, Buddhist, Jain, Tantric); ties with Indian art, caste, cult, cosmology, and spiritual ideals.
- 160 **Buddhism** (3) Hiltebeitel  
Origin, development, and contemporary status of Buddhist life and thought; its impact on Asia.
- 161 **Islam** (3) Nasr  
Origin, development, and contemporary status of Islamic life and thought; its impact on the Near East.
- 163 **Islamic Religion and Art** (3) Nasr  
Investigation of major forms of Islamic art, such as calligraphy, architecture, and urban design; Quranic chanting, poetry, and music in relation to the principles of Islamic revelation. Same as Art 119.
- 164 **Islamic Philosophy and Theology** (3) Nasr  
The major schools of Islamic philosophy and theology, considered in both a morphological and historical manner. The relation between revelation and reason, determination and free will, and divine and human knowledge as well as the relation among science, philosophy, and religion. The development of various schools of thought, from the classical period to the present.
- 165 **Sufism (Islamic Mysticism)** (3) Nasr  
The foundation of Sufism in the Quranic revelation, its subsequent development, and its significance within Islamic civilization. Doctrines and practices of Sufism; history of the Sufi orders; Sufi literature, particularly in Arabic and Persian. The influence of Sufism upon social and political life and its state and role in the contemporary world, both Islamic and non-Islamic.
- 172 **Religion in American Culture** (3) Wallace  
Growth of religious groups and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene.
- 174 **American Judaism** (3) Eisen  
Religious thought and institutions with emphasis on contemporary Judaism. Mythic and ritual life of American Jews, including responses to Israel, diaspora, the Holocaust, family and community dynamics.
- 181 **Women in Western Religion** (3) Quitslund  
Historical, theological, and ethical investigation of the image and role of women in Judaism and Christianity: special consideration of the Biblical experience, the sexual qualifications for religious office, use of male and female images and languages, and contemporary issues. Same as WStu 181.



**190 Selected Topics (3)**

Staff

Critical examination of religious phenomena rendered timely by current events or special resources. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

**191 Senior Honors Thesis (3)**

Staff

Required of and open only to undergraduate honors candidates in religion. (Fall and spring)

**ROMANCE LANGUAGES AND LITERATURES**

Professors J.A. Frey (Chair), J.F. Burks, I. Azar, P.G. Sáenz

Associate Professors M.A.B. Coffland, G. Ludlow, J.F. Thibault

Assistant Professors G.P. Huvé, Y. Captain-Hidalgo, J.A. Quiroga, R. Valero, I.R. Vergara, E. Marder

Adjunct Associate Professor M. Feretti

Bachelor of Arts with a major in (1) French language and literature, (2) Spanish language and literature, (3) Spanish-American literature—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Fren/Span 1–2–3, 4, 8 or 9, 10, 30, or equivalent.

3. Required for the majors—Fren 53, 54, and 90; or Span 53, 54, and 90; or Span 55, 56, and 90; plus a minimum of 15 credit hours of 100-level courses, of which at least 9 hours must be in literature. In addition, a proseminar (Fren/Span 199–200) is required. The student is expected to demonstrate a knowledge of his or her field in breadth and depth by passing a comprehensive examination at the end of the senior year.

Minor in French or Hispanic languages and literatures—Required: 9 credit hours chosen from Fren or Span 30, 53, 54, 90 and Span 55, 56; 12 additional hours selected from among French or Spanish courses numbered 8 and above, including at least 6 credit hours of 100-level courses.

**Placement Examinations:** A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

**FRENCH**

**Departmental prerequisite:** Fren 4 or equivalent is prerequisite to all courses in French, from Fren 8 and above.

**1 Basic French I (4)**

Staff

First-semester French. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$50. (Fall, spring, and summer)

**2 Basic French II (4)**

Staff

Second-semester French. Emphasis on communication, composition, and reading. Prerequisite: Fren 1 or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)

**3 Intermediate French (4)**

Staff

Third-semester language study. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Fren 2 or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)

**4 Language and Culture (3)**

Frey and Staff

Fourth-semester language study. History, geography, and culture of France, with emphasis on conversation and composition. Prerequisite: Fren 3 or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)

**8 The Language of Business, Commerce, and Management (3)**

Staff

Fifth-semester language study; refining of general linguistic competence; introduction to French economic life; the language of business and finance. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Fren 4 or equivalent. Students who receive credit for Fren 8 cannot receive credit for Fren 9. Laboratory fee, \$50. (Fall)

- 9 Contemporary Institutions (3)** Staff  
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Fren 4. Students who receive credit for Fren 9 cannot receive credit for Fren 8. Laboratory fee, \$50. (Fall, spring, and summer)
- 10 Press, Communication, and Politics (3)** Staff  
Sixth-semester language study utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of France and the Francophone world. Prerequisite: Fren 8 or 9. Laboratory fee, \$50. (Fall, spring, and summer)
- 20 French Pronunciation (3)** Huvé  
The sounds of French. Oral readings, presentations, recitation. Poetry, scenes from plays. Emphasis on phonetics and diction, with attention to accent, rhythm, and intonation. Prerequisite: Fren 10. Laboratory fee, \$50. (Spring)
- 30 General Readings in French Literature (3)** Marder and Staff  
Readings in prose, poetry, and drama. Introduction to techniques of textual criticism; attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Fren 10. (Fall and spring)
- 49 French for Graduate Students (0)** Staff  
For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours. (Fall, spring, and summer)
- 53 History of French Literature from the Middle Ages Through the 17th Century (3)** Burks, Coffland  
Lecture and discussion in French. Development of genre and movements. Selected readings across these periods plus the reading of complete texts of epics, essays, novels, and plays. Prerequisite: Fren 30 or equivalent. (Fall)
- 54 History of French Literature from the 18th Through the 20th Century (3)** Burks, Coffland  
Lecture and discussion in French. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Fren 30 or equivalent. (Spring)
- 90 Textual Analysis (3)** Burks  
Methodology and vocabulary of literary criticism. Application of various principles of textual analysis and critical approaches to literature. Prerequisite: Fren 30 or equivalent. (Spring)
- 108 Advanced French Grammar and Style (3)** Thibault and Staff  
Composition, drills, dictations. Translations into French. Study of vocabulary and syntax, with emphasis on stylistic devices. Prerequisite: Fren 10. (Fall)
- 109 Contemporary France (3)** Huvé and Staff  
Emphasis on advanced oral work. Discussion of French culture and civilization, based on contemporary writings and video documents. Prerequisite: Fren 10. Laboratory fee, \$50. (Fall)
- 110 Business and Commercial French (3)** Huvé and Staff  
Structure and language of French economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Preparation for the certificate of the Paris Chamber of Commerce. Prerequisite: Fren 10. (Spring)
- 120 Studies in Medieval French Literature (3)** Coffland  
Readings and analysis of the major literary texts from the 11th through 15th centuries. *Chansons de geste*, courtly literature, fabliaux, drama, lyric and didactic poetry.
- 121 French Literature of the Renaissance (3)** Burks and Staff  
The development and maturation of humanistic ideals in France during the 16th century. Rabelais, Montaigne, and *La Pléiade*.
- 122 The Age of Classicism (3)** Burks, Ludlow  
Drama, philosophy, criticism, poetry, and fiction of the 17th century. Study of major social, political, and religious movements: *préciosité*, Baroque, jansenism, rationalism.



- 123 **The Age of Enlightenment** (3) Ludlow  
Study of major novelists, dramatists, philosophes, and ideologues of the 18th century. The influence of the works of Montesquieu, Voltaire, Diderot, and Rousseau on European and American thought of the period.
- 124 **19th-Century French Literature** (3) Frey, Thibault  
Study of the major literary movements of the 19th century from romanticism to symbolism. Emphasis on stylistic analysis of major poems, novels, and dramas.
- 125 **Studies in 20th-Century French Literature** (3) Coffland, Thibault  
The major literary movements of the 20th century: avant-garde, surrealism, existentialism, *nouveau roman*, and *nouveau théâtre*.
- 130 **Theory of Poetic Discourse** (3) Frey  
An examination of the creation and evolution of poetic genres. Textual analysis of major French poets.
- 131 **Theory of Narrative Discourse** (3) Thibault, Marder  
Study of the various traditions in the novel, from its medieval origins to the present.
- 132 **Theory of Drama** (3) Burks, Marder  
Study of major dramatic genre. Medieval forms, classic tragedy and comedy; Romantic drama and melodrama; *fin de siècle*; contemporary theatre.
- 133-34 **Special Topics in French Literature** (3-3) Burks, Marder  
May be repeated for credit provided the topic differs. Fall 1993: Images of war, 1914-1968. Spring 1994: Women's voices in French literature.
- 199-200 **Proseminar** (3-3) Staff  
Required of all majors; preparation for the major field examination. Conferences, group discussion, practicum; literature in relation to the other arts and the social sciences. Fren 199: textual analysis, literary criticism, theory, and methods. Fren 200: the concepts of literary history and the history of French literature; periods, authors, genres, topics. (Academic year)

## ITALIAN

- 1 **Basic Italian I** (4) Staff  
First-semester Italian. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$50. (Fall, spring, and summer)
- 2 **Basic Italian II** (4) Staff  
Second-semester Italian. Emphasis on communication, composition, and reading. Prerequisite: Ital I or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)
- 3 **Intermediate Italian** (4) Staff  
Third-semester Italian. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Ital 2 or equivalent. Laboratory fee, \$50. (Fall)
- 4 **Language and Culture** (3) Ferretti  
Fourth-semester language study. History, geography, and culture of Italy, with emphasis on conversation and composition. Prerequisite: Ital 3 or equivalent. Laboratory fee, \$50 per semester. (Spring)
- 9 **Contemporary Institutions** (3) Ferretti  
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Ital 4. Laboratory fee, \$50.
- 10 **Press, Communication, and Politics** (3) Ferretti  
Sixth-semester language study, utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Italy. Prerequisite: Ital 9. Laboratory fee, \$50.
- 51-52 **Survey of Italian Literature** (3-3) Ferretti  
Readings in Italian literature from the Middle Ages to the present. Lectures, reports, and informal discussions.

## PORTUGUESE

- 1 **Basic Portuguese I** (4) Staff  
First-semester Portuguese. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$50. (Fall)
- 2 **Basic Portuguese II** (4) Staff  
Second-semester Portuguese. Emphasis on communication, composition, and reading. Prerequisite: Port 1 or equivalent. Laboratory fee, \$50. (Spring)
- 3 **Intermediate Portuguese** (4) Staff  
Third-semester Portuguese. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Port 2 or equivalent. Laboratory fee, \$50. (Fall)
- 4 **Language and Culture** (3) Staff  
Fourth-semester language study. History, geography, and culture of Brazil, with emphasis on conversation and composition. Prerequisite: Port 3 or equivalent. Laboratory fee, \$50. (Spring)
- 9 **Contemporary Institutions** (3) Staff  
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Port 4. Laboratory fee, \$50. (Fall)
- 10 **Press, Communication, and Politics** (3) Staff  
Sixth-semester language study, utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international issues as seen from the perspective of Brazil and Portugal. Prerequisite: Port 9. Laboratory fee, \$50. (Spring)

## SPANISH

Departmental prerequisite: Span 4 or equivalent is prerequisite to all courses in Spanish, from Span 8 and above.

- 1 **Basic Spanish I** (4) Staff  
First-semester Spanish. Pronunciation, conversation, reading, composition, grammar. Laboratory fee, \$50. (Fall, spring, and summer)
- 2 **Basic Spanish II** (4) Staff  
Second-semester Spanish. Emphasis on communication, composition, and reading. Prerequisite: Span 1 or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)
- 3 **Intermediate Spanish** (4) Staff  
Third-semester Spanish. Complete review of grammar. Emphasis on vocabulary acquisition, reading, and composition. Prerequisite: Span 2 or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)
- 4 **Language and Culture** (3) Staff  
Fourth-semester language study. History, geography, and culture of Spain, with emphasis on conversation and composition. Prerequisite: Span 3 or equivalent. Laboratory fee, \$50. (Fall, spring, and summer)
- 8 **The Language of Business, Commerce, and Management** (3) Staff  
Fifth-semester language study; refining of general linguistic competence; introduction to the economic life of Latin America and Spain; the language of business and finance. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Span 4 or equivalent. Students who receive credit for Span 8 cannot receive credit for Span 9. Laboratory fee, \$50. (Fall)
- 9 **Contemporary Institutions** (3) Vergara and Staff  
Fifth-semester language study based on written and video documentation of contemporary society, institutions, everyday life, current events. Emphasis on oral presentation, stressing communicative skills. Prerequisite: Span 4. Students who receive credit for Span 9 cannot receive credit for Span 8. Laboratory fee, \$50. (Fall, spring, and summer)
- 10 **Press, Communication, and Politics** (3) Vergara and Staff  
Sixth-semester language study utilizing daily and weekly newspapers and magazines. Emphasis on writing skills. Special attention to national and international



- issues as seen from the perspective of Spain and Spanish America. Prerequisite: Span 8 or 9. Laboratory fee, \$50. (Fall, spring, and summer)
- 20 **Spanish Pronunciation** (3) Staff  
The sounds of Spanish. Oral readings, presentations, recitation. Poetry, scenes from plays. Emphasis on phonetics and diction, with attention to accent, rhythm, and intonation. Prerequisite: Span 10. Laboratory fee, \$50. (Spring)
- 30 **General Readings in Spanish Literature** (3) Quiroga and Staff  
Readings in prose, poetry, and drama. Introduction to techniques of textual criticism; attention to linguistic and stylistic difficulties in textual analysis. Prerequisite: Span 10. (Fall and spring)
- 49 **Spanish for Graduate Students** (0) Savin  
For graduate students preparing for reading examinations. No academic credit. Tuition is charged at the rate of 3 credit hours. (Fall and spring)
- 53 **History of Spanish Literature from the Middle Ages Through the Siglo de Oro** (3) Vergara, Sáenz  
Lecture and discussion in Spanish. Development of genre and movements. Selected readings across the period plus the reading of complete texts of epics, essays, novels, and drama. Prerequisite: Span 30 or equivalent. (Fall)
- 54 **History of Spanish Literature from the 18th Through the 20th Century** (3) Vergara, Sáenz  
Lecture and discussion in Spanish. Philosophical and literary movements of the modern period. Selected readings across the period plus the reading of complete texts of novels and drama. Prerequisite: Span 30 or equivalent. (Spring)
- 55 **History of Spanish-American Literature from the Conquest Through Romanticism** (3) Quiroga, Captain-Hidalgo  
Lecture and discussion in Spanish. A survey course that covers all genres and focuses on major trends and issues. Prerequisite: Span 30 or equivalent. (Fall)
- 56 **History of Spanish-American Literature from Modernism to the Present** (3) Quiroga, Captain-Hidalgo  
A survey course that covers all genres and focuses on major trends and issues. Prerequisite: Span 30 or equivalent. (Spring)
- 90 **Textual Analysis** (3) Vergara, Valero  
Methodology and vocabulary of literary criticism. Application of various principles of textual analysis and critical approaches to literature. Prerequisite: Span 30 or equivalent. (Spring)
- 108 **Advanced Spanish Grammar and Style** (3) Sáenz  
Composition, drills, dictations. Translations into Spanish. Study of vocabulary and syntax, with emphasis on stylistic devices. Prerequisite: Span 10. (Fall)
- 109 **Contemporary Spain and Latin America** (3) Quiroga, Vergara  
Emphasis on advanced oral work. Discussion of Hispanic culture and civilization, based on contemporary writings and video documents. Laboratory fee, \$50. Prerequisite: Span 10. (Fall)
- 110 **Business and Commercial Spanish** (3) Staff  
Structure and language of Latin American and Spanish economic institutions. Discussion of legal, financial, and administrative documents. Oral and written reports. Prerequisite: Span 10. (Spring)
- 120 **Studies in Medieval Spanish Literature** (3) Azar  
Reading and analysis of the major literary texts from the 11th through the 15th century. Attention paid to linguistic aspects of Old Spanish.
- 121 **Studies in Golden Age Literature** (3) Azar  
Reading and analysis of the major texts of the 16th and 17th centuries. Lyric poetry and the "invention" of subjectivity. Prose fiction and the structure of life. Golden Age Comedia and the relation between private and public life. Humanism and the Classical Tradition. The invention of the press, the status of writing, and the new culture of the book. The (post)modernity of Golden Age literature.
- 122-23 **Cervantes' Don Quijote and the Rise of the Novel** (3) Valero, Vergara, Azar  
The novel as a genre. Literature as an institution: Western literary tradition constructed and deconstructed. The structure of narrative and the question of truth. Literature and life.

- 124 **18th- and 19th-Century Spanish Literature** (3) Vergara  
Readings in major 18th- and 19th-century texts. Romanticism, *Costumbrismo*, realism, naturalism.
- 125 **Contemporary Spanish Literature** (3) Sáenz  
Prose, poetry, and drama of the 20th century; Generations of 1898, of 1927, the novel after the Spanish Civil War.
- 130 **Theory of Poetic Discourse** (3) Quiroga, Valero  
Major classical and modern poetic traditions and genres. Textual analysis of major Spanish works.
- 131 **Theory of Narrative Discourse** (3) Vergara and Staff  
Emphasis on the novel and short story.
- 132 **Theory of Drama** (3) Azar, Valero  
Study of major dramatic traditions in Spain. Emphasis on the *commedia*.
- 133–34 **Special Topics in Spanish and Spanish-American Literature** (3–3) Quiroga, Azar  
May be repeated for credit provided the topic differs. Fall 1993: North and South—comparative American studies. Spring 1994: Women, honor, and intimacy in Hispanic literature.
- 145 **Modern Spanish-American Poetry** (3) Quiroga, Valero  
Poetry after Modernism: the various metric patterns that characterize the work of authors such as Agustini, Mistral, Huidobro, Villaurrutia, Vallejo, Borges, Neruda, Parra, Cardenal, Guillén, Lezama, and Palés. (Spring)
- 146 **Spanish-American Short Fiction** (3) Valero, Captain-Hidalgo  
Analysis of short stories and short novels by writers such as Quiroga, Rulfo, Fuentes, Cortázar, Zapata Olivella, and Arónas.
- 147 **Spanish-American Polemics** (3) Quiroga, Captain-Hidalgo  
Origin and development of writing in Spanish America and its relationship to the creation of national or nationalist discourse. Readings include excerpts concerning the New World and its inhabitants, the question of independence (cultural and economic), and the discourse for and against slavery. The focus is on the 19th century and the essay.
- 148 **New Narrative in Spanish America** (3) Valero, Captain-Hidalgo  
A study of experimental fiction in Spanish America, with a focus on the literature of the mid-1960s through the 1970s. Precursors of and successors to the new narrative.
- 149 **Spanish-American Colonial Literature** (3) Quiroga, Captain-Hidalgo  
Focus on the literature written before independence, with an incursion into Spanish Medieval and Renaissance literature.
- 150 **Spanish-American Romanticism and Modernism** (3) Quiroga, Vergara  
Key writers and trends that characterize Romanticism and Modernism. Readings include works from the period of the French and American Revolutions: Andrés, Sarmiento, Olmedo, Heredia, Darfo, Martí, and Lugones.
- 199–200 **Proseminar** (3–3) Staff  
Required of all majors: preparation for the major field examination. Conferences, group discussion, practicum; literature in relation to the other arts and the social sciences. Span 199: textual analysis, literary criticism, theory, and methods. Span 200: the concepts of literary history and the history of Spanish literature; periods, authors, genres, topics. (Academic year)

## SERVICE-LEARNING PROGRAM

- 152 **Issues in Human Services** (3 or 6) Nashman  
An inquiry into the values and methods of practitioners in the field of human services, linking academic study and field experience. Admission by permission of instructor. (Fall and spring)
- 154 **Independent Study** (1 to 6) McAleavey and Staff  
Fieldwork combined with academic study, involving field placements and complementary academic program of study, under the supervision of an appropriate faculty member. Students must contract with the agency, the faculty member, and the Service-Learning Program. Admission by permission of director. (Fall and spring)



**700 SERIES**

The 700 Series is made up of experimental or special courses that are on the cutting edge of the academic endeavor. Often, courses in the 700 Series focus on interdisciplinary or very current issues in a field. Because 700 Series courses change each semester, students should consult the *Schedule of Classes* for offerings. Courses are listed with the participating departments; course descriptions appear in a specially designated section of the Schedule.

Courses numbered 701 are in general studies, 721 courses are interdepartmental, 751 courses are interschool, and 770s are taught by University Professors and are listed in this Bulletin under the designation of University Professors. The program is coordinated by the Director of Summer Sessions and Experimental Programs.

**SLAVIC LANGUAGES AND LITERATURES**

Professor C.A. Moser

Associate Professors Y. Olkhovsky, I. Thompson (Chair)

Associate Professorial Lecturer S. Ficks

Assistant Professors R.M. Robin, P. Rollberg

*Bachelor of Arts with a major in Russian language and literature*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses—Slav 5-6 (preferred), or Slav 1-2, 3-4; or equivalent; and Slav 91-92.

3. Required for the major: 42 credit hours of course work in the Department of Slavic Languages and Literatures distributed as follows: language—18 hours (Slav 11-12 and 109-10); culture—6 hours (Slav 161-62); literature in Russian—6 hours chosen from Slav 171, 172, 173, 174; literature in English translation—6 hours chosen from 100-level courses (Slav 166 must be included); Slav 199-200.

A student who is already proficient in Russian language or literature may, upon passing an appropriate examination, waive any or all of the language or literature courses below the 100 level, as well as up to 6 credit hours of 100-level courses.

*Minor in Russian language and literature*—Slav 1-2 and 3-4 or 5-6; 9-10 or 101-2; 12 credit hours chosen from Slav 91-92, 161-62, and 165, 166.

**Placement Examination:** A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

**1-2 Basic Russian (4-4)**

Staff

First part of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Slav 1 is prerequisite to Slav 2. Laboratory fee, \$50 per semester. (Academic year)

**3-4 Basic Russian (4-4)**

Staff

Second half of beginning course in fundamentals of speaking, understanding, reading, and writing Russian. Prerequisite to Slav 3: Slav 1-2 or equivalent. Prerequisite to Slav 4: Slav 3. Laboratory fee, \$50 per semester. (Academic year)

**5-6 Intensive Basic Russian (8-8)**

Robin and Staff

Beginning intensive course in fundamentals of speaking, understanding, reading, and writing Russian (equivalent to Slav 1-2 and 3-4). Recommended for majors. Prerequisite to Slav 6: Slav 2 or 5 or equivalent. Laboratory fee, \$70 per semester. (Academic year)

**9-10 Intermediate Russian (3-3)**

Thompson

Practice in speaking, listening, reading, and writing at the intermediate level. Prerequisite: Slav 4, 6, or permission of instructor. Laboratory fee, \$50 per semester. (Academic year)

**11-12 Intensive Intermediate Russian (6-6)**

Robin

Intermediate intensive course in speaking, understanding, reading, and writing Russian. Compared to Slav 9-10, includes additional practice in language skills.

- Prerequisite: Slav 4, 6, or permission of instructor. Recommended for majors. Laboratory fee, \$70 per semester. (Academic year)
- 21-22 **Basic Czech (3-3)** Staff  
Beginning course in fundamentals of speaking, understanding, reading, and writing Czech. Prerequisite to Slav 22: Slav 21 or equivalent. Laboratory fee, \$50 per semester. (Offered when the demand warrants)
- 31-32 **Basic Polish (3-3)** Staff  
Beginning course in fundamentals of speaking, understanding, reading, and writing Polish. Prerequisite to Slav 32: Slav 31 or equivalent. Laboratory fee, \$50 per semester. (Offered when the demand warrants)
- 51-52 **Basic Bulgarian (3-3)** Moser  
Beginning course in fundamentals of speaking, understanding, reading, and writing Bulgarian. Prerequisite to Slav 52: Slav 51 or equivalent. Laboratory fee, \$50 per semester. (Offered when the demand warrants)
- 91-92 **Introduction to Russian Literature (3-3)** Rollberg  
Emergence and development of Russian literature and ideas during the 19th and early 20th centuries—in English. (Academic year)
- 101-2 **Readings in the Russian Press (3-3)** Ficks  
Representative reading of Russian periodicals and current publications. Prerequisite: Slav 4 or 6 or permission of instructor.
- 109-10 **Advanced Russian (3-3)** Thompson  
Practice in speaking, listening, reading, and writing at the advanced level. Prerequisite: Slav 12 or permission of instructor. Laboratory fee, \$50 per semester. (Academic year)
- 161-62 **Russian Culture (3-3)** Olkhovsky  
Survey of Russian cultural heritage from origins of ancient Russia to present—in English. (Academic year)
- 165 **Russian Literature from the Revolution to World War II (3)** Rollberg  
Basic themes, trends, and literary figures of the 1920s and 1930s; the impact of the revolution on writers and literature; emergence of social realism—in English.
- 166 **Russian Literature from World War II to the Present (3)** Rollberg  
Literature in wartime and in postwar years: the "thaws," the new generation of writers, and new trends in literature since the 1960s—in English.
- 171 **19th-Century Russian Prose (3)** Moser  
Reading and discussion of selected prose texts of the 19th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 91-92. (Fall, even years)
- 172 **19th-Century Russian Poetry (3)** Moser  
Reading and discussion of selected poetry of the 19th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 91-92. (Spring, odd years)
- 173 **20th-Century Russian Prose (3)** Rollberg  
Reading and discussion of selected prose of the 20th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 165, 166. (Fall, odd years)
- 174 **20th-Century Russian Poetry (3)** Rollberg  
Reading and discussion of selected poetry of the 20th century—in Russian. Prerequisite: Slav 10 or equivalent; Slav 165, 166. (Spring, even years)
- 195 **Special Topics in Russian (3)** Staff  
May be repeated for credit. Prerequisite: Slav 9-10 or 11-12, 165, 166, and permission of department chair and instructor.
- 199-200 **Proseminar: Readings for the Major (3-3)** Moser, Thompson  
Review and analysis of language and literature. (Academic year)

## SOCIOLOGY

University Professor A. Etzioni  
Professors R.W. Stephens, T.F. Courtless, Jr., P.H.M. Lengermann, R.A. Wallace, P. Langton,  
W.J. Chambliss  
Adjunct Professor W.V. D'Antonio  
Associate Professors J.L. Tropea (Chair), S.A. Tuch, R. Weltzer  
Associate Professorial Lecturer R.B. Zamoff  
Adjunct Assistant Professor C. Deitch

Bachelor of Arts with a major in sociology—The following requirements must be fulfilled:



1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite course—Soc 1.
3. Required courses in related areas—12 credit hours in one of the following related social science fields: anthropology, economics, geography, history, political science, or psychology.
4. Required courses in the major—Soc 103, 140–41, 191, and 15 additional credit hours in 100-level sociology courses.

*Bachelor of Arts with a major in criminal justice*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Prerequisite course—Soc 1.
3. Required courses in related areas—Anth 154, Phil 142, PSc 115, and Psyc 154.
4. Required courses in the major—Soc 135, 136, 137, 139, 192, plus three additional 100-level sociology courses.

*Special Honors*—In addition to meeting the general requirements stated under University Regulations, a candidate for graduation with Special Honors in sociology must maintain a 3.3 grade-point average in sociology and must have completed at least 12 hours of sociology courses at George Washington University, including one course in either theory or in methods. A candidate for Special Honors must complete a senior honors thesis in Soc 195; the candidate must be registered in Soc 195 no later than the first semester of the senior year.

*Minor in sociology*—A minimum of 15 hours of course work, including Soc 1 and 103 or 140, plus 9 hours of electives in courses at the 100 level or higher. Departmental advising is required.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Departmental majors may not take a second major or a minor within the department. That is, a student majoring in sociology may not declare a second major in criminal justice, nor vice versa; a student with a major in criminal justice may not declare a minor in sociology.

**Departmental prerequisite:** Soc 1 is prerequisite to all sociology courses except Soc 3 and 181.

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| <b>1 Introduction to Sociology (3)</b>   | <b>Staff</b>                                 |
| A broad overview of the "sociological imagination" as a way of understanding social events and personal experience; sociology's place among the social sciences; basic elements of sociological perspectives. (Fall and spring)  |  |
| <b>2 Studying Society (3)</b>  | <b>Staff</b>                                 |
| Basic sociological knowledge about contemporary American society; a general and critical introduction to quantitative and qualitative research methods used by sociologists to study major societal issues. (Fall and spring)  |  |
| <b>3 Introduction to Criminal Justice (3)</b>  | <b>Chambliss, Courtless, Tropea, Weitzer</b> |
| An introduction to the study of criminal justice. The historical development of criminal justice and its evolution into modern legal systems. The impact of different forms of criminal justice on society and the individual. (Fall and spring)                             |  |
| <b>103 Major Sociological Perspectives (3)</b>   | <b>Lengermann, Wallace</b>                   |
| An examination of the development and contemporary content of the major theoretical perspectives guiding sociological work. Theories include functionalism, exchange theory, critical theory, conflict theory, symbolic interactionism, and phenomenology. (Fall and spring) |  |
| <b>120 Sociology and Public Policy (3)</b>   | <b>Staff</b>                                 |
| Introduction to concepts, theory, and research illustrating the application of the sociological perspective to public policy.  |  |
| <b>122 Death and Dying: A Sociological Perspective (3)</b>   | <b>Langton</b>                               |
| Processes of death and dying examined from the perspectives of dying persons, their families, and professionals. Death as a social institution and various social  |  |

- issues surrounding death, such as suicide, euthanasia, capital punishment, and death-related social movements, are analyzed. (Spring)
- 124 **Sociology of Health Care** (3) Langton  
Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medical organizations, problems of delivery of health care services. (Fall)
- 125 **Sociology of Religion** (3) Wallace, Yeide  
An analysis of the relationships between religion and society. Topics include the emergence of uniquely American religious forms such as civil religion and cultic groups. (Fall, odd years)
- 129 **Race and Minority Relations** (3) Stephens, Tuch  
Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. (Spring)
- 130 **Class and Inequality in American Society** (3) Tuch  
Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; international comparisons; analysis of public policies that affect these distributions. (Fall)
- 132 **The Family in Modern Society** (3) Stephens  
An examination of the stages of family life: birth, childhood, premarital relationships, marriage and sex roles in marriage, retirement and old age. Special emphasis on development and maintenance of interpersonal relations. (Fall)
- 133 **Learning and the Life Cycle** (3) Tropea, Wallace  
Sociological approaches to learning from childhood through adolescence and adulthood. Emphasis on the impact of social institutions and group interaction on the learning process. (Spring)
- 134 **Violence and the Family** (3) Tropea  
Comparative approach to power and violence in family systems. Analysis of devaluation of family relations. Critical survey of explanations of violence and responses made to it. (Fall)
- 135 **Youth and Delinquency** (3) Chambliss, Courtless, Tropea  
Analysis of historical, economic, and social conditions affecting both difficulties in socializing youth and the evolution of the state's formal systems of control. (Spring)
- 136 **Criminology** (3) Chambliss, Tropea, Courtless  
Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society. Analysis of the historical, social, legal, and cultural conditions affecting the nature of crime, criminality, and the development of state responses made to it. (Fall)
- 137 **Sociology of Law** (3) Chambliss, Courtless, Tropea, Weitzer  
Law as a social phenomenon and agency of social control. Special emphasis is placed on study of the sources of and challenges to the legitimacy of law. (Fall)
- 138 **Alcohol, Alcoholism, and Society** (3) Langton  
An overview of alcohol use and abuse in American society; impact on work, family, and crime; policies and legislation for social control of problem drinking and alcoholism. (Fall and spring)
- 139 **Deviance and Control** (3) Chambliss, Tropea, Courtless, Weitzer  
Analysis of the creation of deviance through collective definitions and responses. Development of a perspective on processes of becoming deviant. (Spring)
- 140 **Social Research Methods** (3) Tuch  
Introduction to basic research methods in sociology. Topics include research design, sampling, measurement, and elementary data analysis via computer application. (Fall)
- 141 **Techniques of Data Analysis** (3) Tuch  
Continuation of Soc 140. Examination of a range of topics in the statistical analysis of sociological data, with a strong emphasis on computer applications. Prerequisite: Soc 140. (Spring)
- 143 **Social Movements** (3) Stephens  
General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions. (Spring)



- 144 Sociology of Terror (3)** Courtless, Chambliss  
Examination of contemporary terrorism, using historical and sociological perspectives. The state and terrorism (the state as terrorist, state-supported terrorism, and the limitations and possibilities of state response to the threat of terrorism). (Spring)
- 145 Introduction to Criminal Law (3)** Courtless  
Introduction to the sources and fundamental principles of criminal law and procedure using major sociological perspectives as interpretive tools. (Spring)
- 152 Field Experience in Sociology (9)** Staff  
Development of a comprehensive perspective and applied skills in selected social systems through seminars, readings, research, and field placement. Requires 16 hours of field work weekly. Recommended for juniors and seniors. Open to all but majors in criminal justice. Topics include health, aging, and family. (Fall or spring)
- 155 Sociology of Sex and Gender (3)** Wallace, Lengermann  
The roles of women and men from social structural and social psychological perspectives. Analysis of gender inequality in such areas as the family, the workforce, the media, politics, law, religion, and education. (Fall)
- 181 Special Topics (3)** Staff  
Analysis and examination of various processes in society of general importance to the field of sociology, e.g., social conflict, socialization, social change. Topic changes each semester; may be repeated for credit. (Fall)
- 191 Senior Seminar (3)** Staff  
A final review of the field for sociology majors nearing graduation. The course emphasizes the integration of theory and research, critical reflection and evaluation, and recent developments in sociology. Required for all sociology majors. Prerequisites: Soc 103, 140, and 141. (Fall and Spring)
- 192 Advanced Seminar and Fieldwork in Criminal Justice (9)** Chambliss, Courtless, Tropea, Weitzer  
Review of the field of criminal justice for majors nearing graduation. Field experiences; recent developments, research, and practices. Sixteen hours of fieldwork and four hours of seminar attendance required weekly. Admission by permission of advisor. (Fall, spring, and summer)
- 195 Research (1, 2, or 3)** Staff  
Independent study and special projects. Open only to selected undergraduate students with promising academic records. Prerequisite: Students must submit a written proposal of their plan of study for the approval of the staff member of the department who will be directing the research. May be repeated for credit to a maximum of 6 credits. (Fall and spring)

## SPANISH

See Romance Languages and Literatures.

## SPECIAL EDUCATION

See Teacher Preparation and Special Education.

## SPEECH AND HEARING

Professors J.W. Hillis, L.S. Bowling, C.W. Linebaugh (Chair)  
Associate Professors M.D.M. Brewer, J.R. Regnell, W.P. Cupples  
Assistant Professorial Lecturer M.E. Moody

*Bachelor of Arts with a major in speech and hearing science*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in related areas—Anth 4 or 161; Psyc 121 and 131 (or their equivalent), plus 12 additional credit hours of 100-level courses selected from related areas as approved by the major advisor.
3. Required courses in the major—SpHr 11, 71, 101, 102, 103, 104, 108, 118, 119, 120.

Minor in speech and hearing—15 credit hours are required, including SpHr 11, 101, 103, and at least 6 credit hours of 100-level courses to be selected from SpHr 102, 104, 108, 118, 119, and 120.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

Speech and hearing therapy: See the Speech and Hearing Center.

- 11 Voice and Diction (3)** Regnell, Bowling  
Development of naturalness, correctness, and clarity in conversation through the study of phonetics, rate, volume, pitch, and quality in preparation for performance. Laboratory fee, \$10. (Fall, spring, and summer)
- 71 Foundations of Human Communication (3)** Linebaugh  
An introduction to the fundamental principles of the biology of speech, hearing and language, language structure and use, and human communicative interaction. Practice in the identification of specific verbal and nonverbal aspects of communication behavior. (Fall)
- 101 Hearing Science (3)** Brewer  
Anatomy and physiology of the auditory mechanism; basic acoustics and psychoacoustics. Theories of hearing and frequency and intensity perception. Laboratory fee, \$20. (Fall)
- 102 Neural Substrates of Speech, Hearing, and Language (3)** Linebaugh  
Neuroanatomy and neurophysiology as they relate to speech, hearing, and language. Emphasis on sensory and motor systems and neuroanatomical correlates of language processing; neurolinguistics. Laboratory fee, \$20. (Spring)
- 103 Speech Science (3)** Linebaugh  
Functions of the respiratory, laryngeal, and orofacial structures in normal speech production; physiological and acoustic phonetics. Laboratory fee, \$20. (Fall)
- 104 Speech and Language Disorders (3)** Regnell  
Survey of the nature and causes of developmental and acquired disorders of speech and language. Emphasis on prevention and effective communication with persons having a speech-language impairment. (Spring)
- 108 Introduction to Audiology (3)** Brewer  
Survey of the field of audiology, including the measurement of hearing, the nature and causes of hearing impairment, hearing aids and habilitation/rehabilitation of the hearing impaired. Prerequisite: SpHr 101. Laboratory fee, \$20. (Spring)
- 118 Structure and Analysis of Speech and Language (3)** Staff  
Semantic, morphologic, syntactic, phonologic, and pragmatic aspects of language. Methods for the analysis of speech and language, including practice in phonetic/phonemic transcription. Laboratory fee, \$15. (Fall)
- 119 Experimental Analysis of Communication Behavior (3)** Hillis  
Assessment of speaker-listener behavior; acoustic, behavioral, and linguistic properties of speaker intelligibility and credibility; behavioral observation and computer technology in measurement and modification of speaker-listener attributes. (For laboratory credit, register for 1 hour of SpHr 196.) Prerequisite: Psyc 1 or SpHr 71. Laboratory fee, \$20. (Fall)
- 120 Speech and Language Development (3)** Cupples  
Development of speech, language, and auditory and related cognitive processes. Application of analytic methods to developmental and cultural variations in speech and language. Prerequisite: SpHr 118 or equivalent. (Spring)
- 196 Independent Study (1 to 6)** Staff  
Independent research and special projects. Before students are permitted to register for SpHr 196, they must submit a written proposal of the plan of study and obtain approval of the staff member who will direct the study and of the department chair.

## SPEECH COMMUNICATION

See Communication Studies.



**STATISTICS/COMPUTER AND INFORMATION SYSTEMS**

Professors H.W. Lilliefors, A.D. Kirsch (Chair), J.L. Gastwirth, S.W. Greenhouse (Emeritus), N.D. Singpurwalla, R.T. Smythe, J.M. Lachin III, K.K.G. Lan

Professorial Lecturers J. Kullback, F. Ponti, W.R. Nunn, N. Kirkendall, F. Scheuren

Associate Professors R.E. Thomas (Emeritus), H.M. Mahmoud, T.K. Nayak, R.P. Bain (Research)

Associate Professorial Lecturers R.F. Teitel, J.S. Wu, C. Toppe

Assistant Professors D.A. Grier, B. Toman, C.B. Hurley, D.E. Thompson (Research), D.

Verme (Research), S. Bose, R. Modarres-Hakimi, C.H. Chen, R. Orlandic (Visiting), W.F.

Rosenberger (Research), E.A. Phillips (Research)

Assistant Professorial Lecturer R. Fernandez

*Bachelor of Science with a major in statistics, statistics with an option in computer science, or computer and information systems*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

2. Prerequisite courses for all majors—Math 31, 32, 33; Stat 91 (except computer and information systems majors).

3. Required courses for all majors—Math 124; Stat 129, 130.

4. (a) Required courses for the statistics major—Stat 118, 119, 157–58, 185 or 189, plus three approved 100-level courses in statistics.

(b) Required courses for the statistics major with an option in computer science—Stat 118, 119, 131, 157–58, plus three approved 100-level computer related courses. Math 105 is recommended.

(c) Required courses for the computer and information systems major—Stat 131, 132, 133, 134, 135, 142; two courses chosen from Stat 157–58, 157 and 185, or 189–90; plus two approved courses from Stat 145, 146, 147, 148, 150, 173. Math 105 is recommended.

5. Students interested in eventually pursuing a Ph.D. program in statistics are advised to take Stat 190, Math 139 and 140, and two years of a foreign language. Math 157 is also recommended.

6. To assure a balanced program, departmental approval of electives is required for all majors.

Students who seek Special Honors in statistics should check with the Department.

*Minor in statistics*—18 hours of approved courses in this department, including an introductory statistics course, Stat 118, and one computer course.

*Minor in computer and information systems*—18 hours of approved courses in this department, including Stat 129, 130, and 131, and two additional computer courses selected with approval of advisor as well as one course in statistical methods. One year of calculus is recommended.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Stat 51, 53, 91, 104, 111, and 127 are related in their subject matter, and credit for only one of the six may be applied toward a degree. One entrance unit in algebra is prerequisite to all courses in statistics.

**51 Introduction to Business and Economic Statistics (3)** Staff

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, probability distributions, sampling, estimation, tests of hypotheses, regression and correlation. (Fall and spring)

**53 Introduction to Statistics in Social Science (3)** Staff

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, regression and correlation. (Fall and spring)

**91 Principles of Statistical Methods (3)** Staff

Probability, frequency distributions and their characteristics, descriptive measures, estimation, tests of hypotheses, regression and correlation. Primarily for students in the natural sciences. (Fall)

- 103 Sampling in Accounting (3)** Staff  
Special emphasis on applications of sampling techniques and design to accounting problems. Prerequisite: Stat 51, 53, 91, or equivalent (Fall and spring)
- 104 Statistics in Management, Administration, and Policy Studies (3)** Staff  
Lecture (3 hours), laboratory (1 hour). Introductory study of statistical techniques for research problems. For graduate students in fields other than statistics who have no previous statistics training. Offered off campus only.
- 105 Statistics in the Behavioral Sciences (3)** Kirsch  
Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, non-parametric techniques, sampling theory. Prerequisite: Stat 53, 104, or equivalent, and satisfactory performance on a placement examination. (Fall and spring)
- 111 Business and Economic Statistics I (3)** Nayak and Staff  
Descriptive statistics, graphical methods, probability, special distributions, random variables, sampling, correlation, estimation and confidence intervals, hypothesis testing. (Fall)
- 112 Business and Economics Statistics II (3)** Nayak and Staff  
Continuation of Stat 111, with emphasis on techniques of regression, chi-square, sampling designs, index numbers, and other topics used in economics and business. Prerequisite: Stat 111 or equivalent. (Spring)
- 118 Regression Analysis (3)** Hurley  
Lecture (3 hours), laboratory (1 hour). Simple and multiple linear regression, partial correlation, residual analysis, stepwise model building, multicollinearity and diagnostic methods, indicator variables. Prerequisite: 3 credit hours selected from Stat 51, 53, 91, 104, 127. (Fall and spring)
- 119 Analysis of Variance (3)** Staff  
Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; randomized block, factorial, Latin square designs, and analysis of covariance. Prerequisite: Stat 118. (Spring)
- 121 Introduction to Categorical Data Analysis (3)** Lan  
Sampling models for contingency tables; measures and tests of association; sample size and power evaluation in matched and unmatched studies; Mantel-Haenszel procedure and its generalizations; modeling in cross-classifications; GSK method and ML approach; logistic regression. (Spring, even years)
- 123 Introduction to Econometrics (3)** Staff  
Same as Econ 123.
- 127 Statistics for the Biological Sciences (3)** Staff  
Introduction to statistical techniques and reasoning applicable to the biomedical and related sciences. Properties of basic probability functions: binomial, Poisson, and normal. Data analysis, inference, and experimental design. (Fall and spring)
- 129 Introduction to Computing (3)** Staff  
Computer and programming concepts; algorithm development. Emphasis on careful construction and implementation of programs using structured programming techniques and a high-level language. (Fall and spring)
- 130 Computer Programming (3)** Staff  
Development of advanced computing ideas: records, recursion, sets, pointer variables and dynamic storage. Introduction to data structures: stacks, queues, linked lists, and binary search trees. Prerequisite: Stat 129 or equivalent. (Fall and spring)
- 131 Data Structures and Algorithms (3)** Staff  
Analysis of algorithms. Abstract data types. Development and application of advanced data structures: priority queues, multilinked lists, sparse matrices, B-trees, tree balancing, and graphs. Sorting and searching algorithms. Prerequisite: Stat 130 or equivalent. (Fall and spring)
- 132 Introduction to Discrete Structures (3)** Mahmoud  
Joint offering of the Statistics and Mathematics Departments. Discrete structures and associated mathematical tools. Topics include sets, functions, relations, directed and undirected graphs, propositional calculus, Boolean algebras, with applications to computer science. Prerequisite: Stat 130 and Math 31. (Fall)



- 133 Computer Organization and Assembly Language (3)** Staff  
Data representation and arithmetic; computer structure and machine language; computer architecture. Assembly language; addressing techniques; file input and output. Study of an actual small computer. Prerequisite: Stat 130. (Fall)
- 134 Operating Systems (3)** Staff  
Techniques for handling simultaneous processes; dynamic procedure activation; synchronization and mutual exclusion; semaphores. Operating system design methodologies; abstract data types; monitors; kernels. Memory management; memory hierarchy; paging. Recovery procedures. Prerequisite: Stat 133. (Spring)
- 135 Survey of Programming Languages (3)** Staff  
Structured and nonstructured languages; list-structured languages; pattern matching and symbol manipulation languages; interpretive and interactive languages; variable binding. Prerequisite: Stat 131. (Spring)
- 142 Introduction to Automata Theory (3)** Mahmoud  
Finite state automata. Turing machines and computability; universal Turing machine; computable and noncomputable functions; halting problem; computational complexity. Formal grammars and their relationship to automata. Prerequisite: Stat 130 and Math/Stat 132. (Spring)
- 145 Compiler Design (3)** Staff  
Grammars, languages, syntax, and semantics. Lexical analysis; symbol tables; context-free language parsing techniques; code generation. Prerequisite: Stat 131. (Spring)
- 146 Design and Development of Software (3)** Staff  
Design techniques; structured programming; code reading; stepwise refinement; top-down design; information hiding; coupling and cohesion. Development of a multicomponent software project by students. Prerequisite: Stat 131. (Fall)
- 147 Artificial Intelligence (3)** Staff  
Representation of knowledge; notational systems such as logics, programming languages, trees, and networks; LISP. Search strategies; heuristics; production rule systems. Algorithms used in AI; natural language processing, vision, manipulator operation, theorem proving, problem solving. Prerequisite: Stat 131. (Fall)
- 148 Database Systems (3)** Staff  
Sequential file processing; random access storage. Hierarchical, network, and relational data models. Data normalization; data description languages; query facilities. File and index organization; inverted files. Data integrity and reliability; computer security. Prerequisite: Stat 130.
- 150 Senior Seminar (3)** Staff  
Advanced topics in computer science. Faculty present examples of current research work in computer science. Students work individually with a faculty advisor. Prerequisite: Senior standing or permission of department.
- 157-58 Introduction to Mathematical Statistics (3-3)** Staff  
Stat 157: Basic concepts of probability theory, including random variables, independence, distribution theory, and sampling theory. Stat 158: Inference procedures, including estimation, hypothesis testing, regression analysis, and experimental design. Prerequisite: Math 32 or equivalent. (Academic year)
- 173 Discrete Systems Simulation (3)** Grier, Hurley  
Same as OR 173. Monte Carlo simulation of discrete stochastic models. Simulation languages. Random-number and random-deviate generation. Statistical design and analysis of simulation experiments. Validation of simulation models. Applications: queuing, inventory, scheduling, computer models. Prerequisite: Stat 130; some statistics. (Spring)
- 181 Applied Time Series Analysis (3)** Wu  
Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate time series. Estimation of spectral density functions, white noise tests, and tests for periodicities. Theory and applications using SAS on the GW computer. Prerequisite: Math 33, Stat 157-58 or 116. (Fall)
- 183 Intermediate Statistical Laboratory: Statistical Computing Packages (3)** Staff  
Application of program packages (e.g., SAS, SPSS, BMDP) to the solution of multivariate statistical problems. Basic concepts in data file preparation/manip-

- ulation, analytical techniques, and interpretation of results. Prerequisite: an introductory statistics course. (Fall and spring)
- 185 **Computer Performance Modeling** (3) Mahmoud, Hurley  
Mathematical tools for modeling and predicting the speed and utilization of computer systems, including deterministic, stochastic, and computer simulation models. Queuing models, Poisson processes, birth-death processes, and response surfaces. Prerequisite: Stat 131 or 157 or equivalent. (Spring)
- 187 **Introduction to Sampling** (3) Staff  
Problems of sampling and sample design. Prerequisite: Stat 91 or equivalent. (Fall)
- 188 **Nonparametric Statistical Inference** (3) Lilliefors  
Statistical inference when the form of the underlying distribution is not fully specified. Nonparametric procedures for estimation and testing hypotheses. An introduction to robust procedures. Prerequisite: Stat 91 or equivalent. (Spring, odd years)
- 189-90 **Mathematical Probability and Applications** (3-3) Staff  
Concepts of probability theory, including combinatorial analysis, conditional probability, and stochastic independence. Random variables and their distributions; laws of large numbers and central limit theorem. Application of concepts to elementary stochastic processes such as coin-tossing sequences, branching processes, Markov chains. Prerequisite: Math 32 or equivalent. (Alternate academic years)
- 195 **Reading and Research** (arr.) Staff  
May be repeated once for credit. Admission by permission of department chair. (Fall and spring)
- 198 **Special Topics** (3) Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the content differs.

## STRATEGIC MANAGEMENT AND PUBLIC POLICY

Professor H.J. Davis

Professorial Lecturers D.M. Devaney, J.H. Joseph

Associate Professors D.J. Lenn (Chair), J.B. Thurman, J. Cook, E.J. Englander, J.H. Beales III

Associate Professorial Lecturer W.N. LaForge

Assistant Professors D.R. Kane, L. Burke, R.M. LeNoir, M. Starik, M. Mallott

Assistant Professorial Lecturer M.N. Richburg

See the School of Business and Public Management for programs of study leading to the degree of Bachelor of Business Administration.

- 51 **Introduction to Business** (3) LeNoir  
Structure, activities, and problems of business enterprise; its contribution to the individual and society; careers in business. Prerequisite: Sophomore standing. (Fall and spring)
- 101 **The Business Environment** (3) Beales, Burke, M. Mallott  
Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. Restricted to seniors in the B.B.A. program. (Fall, spring, and summer)
- 104 **Business and the Legal System** (3) Kane  
General overview of the legal system, role of law, and key legal concepts such as torts and contracts. Specific business applications—antitrust, employer obligations, organization of business enterprise, securities regulation, international law. (Fall, spring, and summer)
- 190 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods.
- 191 **Fundamentals of Management** (3) Davis, LeNoir, Starik  
Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. (Fall and spring)
- 192 **Small-Business Management** (3) Staff  
Theory and practice of small-business management. Focus on effective management of small firms, essentials of planning and organizing the firm, financial and administrative controls. Evaluation of alternative business forms: purchase of an



ongoing firm, franchising, and new business start-ups. Prerequisite: SMPP 191. (Fall)

**197 Strategy Formulation and Implementation (3)** Thurman, Cook, LeNoir, Starik, Burke

An integrative capstone course to develop skills in diagnosing organizational problems, formulating and selecting strategic alternatives, and recognizing problems inherent in strategy implementation. Restricted to seniors in the B.B.A. program. May be taken concurrently with MLOM 188. (Fall, spring, and summer)

**199 Individual Research (arr.)** Staff

Assigned topics. Admission by prior permission of advisor. May be repeated once for credit. (Fall and spring)

## TEACHER PREPARATION AND SPECIAL EDUCATION

Programs in teacher preparation and special education are offered at the graduate level by the School of Education and Human Development. The following courses are available to undergraduates.

## TEACHER EDUCATION

**50 Introduction to Education and Human Services (3)** Beck

The scope of education and human services is defined from historical, philosophical, and cross-cultural perspectives. Field trips and group field experience. (Fall and spring)

**105 Social Issues in Education and Human Services (3)** Paley

Historical and social development of education and human services; evolution of American education related to the growth of the nation and the changing social order; examination of selected issues in contemporary education and human services.

**110 Elementary School Teaching of Reading (3)** Horrworth

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Fieldwork is required. Prerequisite: Educ 104 and TrEd 105 or teaching experience.

**111 Elementary School Curriculum and Methods (2 to 15)** Beck, Paley

A comprehensive block course with subsections in mathematics, science, language arts, social studies, music, art, and physical education. Pre-student teaching three days a week. Prerequisite: Educ 104, 171, 172; TrEd 105; and senior standing. Material fee: \$10 per subsection. (Fall)

**118 Elementary Reading: Classroom Diagnosis and Instruction (3)** Putnam

Emphasis on the interconnections among teaching, learning, and diagnosis within the reading program. Prerequisite: TrEd 110 or equivalent. (Fall)

**128 Children's Literature (3)** Putnam

Landmark works in the various genres of children's literature; strategies for integrating literature into the school curriculum. (Spring)

**132 Student Teaching in Early Childhood Schools (3 or 6)** Beck, Paley

For seniors. Supervised teaching in selected prekindergarten or kindergarten class in accredited school; seminar. Admission by permission of instructor. Prerequisite: TrEd 111 or equivalent; TrEd 150, 152, 153, 154. (Spring)

**135 Student Teaching in Elementary Schools (6 or 12)** Beck, Paley

Supervised teaching in an elementary school. Required seminar. Admission by permission of instructor. Prerequisite: TrEd 111 or equivalent. (Spring)

**150 Foundations of Early Childhood Education (3)** Staff

Historical development, philosophy, and objectives of nursery schools, kindergartens, and day care; exploration of contemporary programs and models with curriculum implications for schools in the United States and abroad. Admission by permission of instructor. (Fall)

**152 Early Childhood Curriculum (3)** Staff

Rationale, development, content approaches, programs, and materials in language arts, mathematics, science, health, social studies, and aesthetic education. Admission by permission of instructor. (Fall)

- 153 **Role of the Professional in Early Childhood Education** (3) Staff  
Planning, reporting, records, teacher-child and teacher-family interaction, diagnosis and evaluation, working with paraprofessionals and parents. Emphasis on total classroom ecology. Admission by permission of instructor. (Spring)
- 154 **Community Resources and Materials for the Young Child** (3) Staff  
Interaction with community agencies and resources for services; equipment, play activities, curriculum materials, and methods for teaching the infant and young child. Admission by permission of instructor. (Spring)
- 197-98 **Research and Independent Study** (3-3) Staff  
Individual or group study or research under the guidance of staff members. Program and conferences arranged with advisor. Admission by permission of advisor. (Academic year)

### SPECIAL EDUCATION

- 58 **Curriculum Adaptation for the Child With Special Needs** (3) Staff  
Lectures, demonstrations, and experiences designed to develop the student's ability to adapt curriculum and style of presentation to meet the needs of the special child. Prerequisite: SpEd 57. (Spring)
- 102 **Practicum in Teaching the Child With Special Needs: Methods and Materials** (3 or 6) Mazur  
Laboratory course taught in an elementary public school. Students observe and participate in a demonstration seminar conducted by the instructor. Must be taken concurrently with SpEd 189. Material fee, \$50. (Fall)
- 168 **Overview of Handicapping Conditions: Etiology and Symptomatology** (3) Staff  
Causes and symptoms of most prevalent handicapping conditions in children who can be mainstreamed.
- 187 **Sign Language and Deafness I** (3) Staff  
Introduction to American Sign Language and to cultural aspects of the deaf community.
- 188 **Sign Language and Deafness II** (3) Staff  
Development of conversational skills in American Sign Language and of cultural awareness of the deaf community. Prerequisite: Educ 187.

### THEATRE AND DANCE

Professors M.R. Withers, A.G. Wade  
Associate Professors N.D. Johnson (Chair), N.C. Garner, L.B. Jacobson, W.A. Pucilowsky  
Assistant Professors B.W. Sabelli, C.F. Gudenius, A.C. Pao  
Lecturer M.K. Grut

*Bachelor of Arts with a major in theatre*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in related areas—12 credit hours in dramatic literature.
3. Required courses in the major—TrDa 14, 130, 131, 136, 139 (3 hours), 145-146, 147; 12 additional credit hours in 100-level theatre and dance courses.

*Bachelor of Arts with a major in dance*—The following requirements must be fulfilled:

1. The general requirements stated under Columbian College and Graduate School of Arts and Sciences.
2. Required courses in related areas: Mus 3-4.
3. Required courses in the major (placement in 100-level technique courses is determined by audition): TrDa 130, 131, 160-61, 162-63, 164-65, 170-71, 172-73, 174-75, 180, 182-83, 184, 186, 190-91, 192, 193-94, 199. At the beginning of the senior year, all dance majors undertake a project in a special area of interest under the supervision of one or more faculty members.

*Bachelor of Arts with a major in dramatic literature*—The Department of Theatre and Dance and the Department of English offer an interdisciplinary major in dramatic literature. This major, which combines the strengths of the two departments, is designed to give



equal consideration to the two key aspects of theatre: the literary text and the production. See Dramatic Literature.

*Minor in Theatre*—18 credit hours of theatre courses, including TrDa 145–46.

*Minor in Dance*—18 credit hours from TrDa 46, 50 through 62, 154, 155, 156, 160–61, 162–63, 164–65, 170–71, 172–73, 174–75, 180, 182–83, 184, 186, 190–91, 192, 195. The program should not include more than 9 hours of dance technique.

With permission, a limited number of graduate courses in the department may be taken for credit toward an undergraduate degree. See the Graduate Programs Bulletin for course listings.

**Note:** Courses below the 100 level are primarily for nonmajors.

- |   |                        |
|---|------------------------|
| <b>11 Theatre Production (3)</b>  | Gudenius and Staff     |
| Understanding of the basic elements of production (performance, technical and management) and the collaborative artist/artisan process through discussion, observation, and practical application. (Fall and spring)  |                        |
| <b>14 Introduction to Acting (3)</b>  | Garner, Jacobson, Wade |
| Basic techniques of concentration, imagination, improvisation, and character development. (Fall and spring)   |                        |
| <b>45 Understanding the Theatre (3)</b>   | Sabelli                |
| The art of the theatre; its literature, architecture, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer. Attendance at theatrical performances and presentations by visiting artists. (Fall and spring)   |                        |
| <b>46 Understanding the Dance (3)</b>   | Staff                  |
| Survey of multiple styles of dance and the relationship of dance to culture and society through the ages. Opportunities to experience dance forms through participation, viewing videotapes and films, and attending theatrical performances. (Fall and spring)   |                        |
| <b>50 Beginning Ballet (1)</b>  | Staff                  |
| <b>51 Beginning/Intermediate Ballet (1)</b>   | Staff                  |
| <b>52 Beginning Modern Dance (1)</b>  | Staff                  |
| <b>53 Beginning/Intermediate Modern Dance (1)</b>   | Staff                  |
| <b>54 Beginning Jazz (1)</b>  | Staff                  |
| <b>55 Beginning/Intermediate Jazz (1)</b>   | Staff                  |
| <b>58 Beginning Spanish Dance (1)</b>   | Grut                   |
| <b>59 Beginning/Intermediate Spanish Dance (1)</b>  | Grut                   |
| <b>62 Beginning Ballroom Dance (1)</b>  | Johnson                |
| <b>105 Fundamentals of Playwriting (3)</b>  | Griffith               |
| Same as Engl 105.   |                        |
| <b>108 Intermediate Playwriting (3)</b>   | Griffith               |
| Same as Engl 108.   |                        |
| <b>112 Voice for the Theatre (3)</b>  | Jacobson               |
| The practice and application of voice production with reference to skeletal alignment, breathing, resonance, and articulation. Emphasis is placed on individual awareness of the process of voice production and its application to performance. Prerequisite: SpHr 11 (for theatre majors) or permission of the instructor. (Fall) |                        |
| <b>113 Stage Dialects (3)</b>   | Jacobson               |
| Vocal production related to interpretation of specific texts. Focus on stage dialects and the interpretation of Shakespeare. Prerequisite: TrDa 112. (Spring)   |                        |
| <b>115 Beginning Scene Study (3)</b>  | Garner, Jacobson       |
| Principles of role development, concentrating on 20th-century material. Prerequisite: TrDa 14. (Fall and spring)  |                        |
| <b>116 Scene Study: Modern Comedy (3)</b>   | Garner, Jacobson       |
| Principles of role development, comic timing, and stage business, concentrating on material by contemporary playwrights, such as Neil Simon. Prerequisite: TrDa 115. (Spring, odd years)  |                        |
| <b>117 Audition Techniques (3)</b>  | Jacobson, Garner       |
| All aspects of the audition process: selection and rehearsal of audition monologues, handling of cold reading, etc. Prerequisite: TrDa 115 or equivalent. (Fall, even years)  |                        |

- 122 Scene Study: Classical Drama (3)** Garner, Jacobson  
Principles of role development and handling of verse dialogue, concentrating on classical Greek and Shakespearian drama. Prerequisite: TrDa 115. (Fall, odd years)
- 123 Scene Study: Classical Comedy (3)** Jacobson, Garner  
Principles of role development, concentrating on material from the English Restoration, Molière, and other 17th- and 18th-century playwrights. Prerequisite: TrDa 115. (Spring, even years)
- 124 Play Analysis (3)** Pao  
Same as Engl 124.
- 130 Basics of Production Design (3)** Sabelli, Pucilowsky, Gudenius  
Understanding of the basic elements of production design and execution through discussion, observation, and practical application. (Fall)
- 131 Introduction to Lighting (3)** Gudenius  
Lecture (2 hours), laboratory (1 hour). Theories and practicum in lighting for theatre and dance. Laboratory fee, \$15. (Fall)
- 132 Makeup Design (3)** Pucilowsky  
Theory and practicum in the art of makeup design, including latex and crepe hair.
- 135 Introduction to Scene Design (3)** Sabelli  
Fundamental study of scenography, including historic overview, drafting, scene painting, rendering, stage properties, and model construction. (Fall, odd years)
- 136 Beginning Costuming (3)** Pucilowsky  
History of fashion in Western civilization from ancient Greece to the 20th century. Fundamental study of costume research through specific projects. Costume construction. (Fall)
- 139 Theatre Practicum (1)** Johnson  
Participation in department mainstage productions in a production, management, or performance capacity under the supervision of a member of the faculty and approved by the instructor. Prerequisite: TrDa 11 or 130. May be repeated for a total of 6 credits. (Fall and spring)
- 140 Anthropology in Performance (3)** Garner, Allen  
Exploration of the relationships among social interaction, ritual, and dramatic performance. Classes consist of improvisation workshops and discussion, based on readings about non-Western cultures. Same as Anth 191. (Spring)
- 143 Theatre in Washington (3)** Garner  
An introduction to the organization and operation of professional theatres in Washington. Attendance at production is required. (Summer)
- 145-46 History of the Theatre (3-3)** Pao  
An examination of the development and growth of the theatre from the beginnings to the present. TrDa 145: Ancient Greece through the 17th century. TrDa 146: the 18th, 19th, and 20th centuries. (Academic year)
- 147 Directing for the Theatre (3)** Garner  
Fundamentals of script analysis, casting, and rehearsal techniques. Prerequisite: TrDa 14, 130, 145-46. Laboratory fee, \$15. (Fall)
- 148 Musical Theatre Production (3 or 6)** Pucilowsky and Staff  
Practicum on all components of a musical theatre production, including principles of design, aesthetics, theory, and historical overview. (Summer)
- 149 Musical Theatre Performance (3)** Jacobson and Staff  
Intensive training and experience in the performance of musical theatre, culminating in a public performance. Practical staging application in movement, breathing techniques for singing, vocal production, and acting. May be repeated for credit. (Summer)
- 154 Creative Dance for Children (3)** Withers  
Dance as an expressive art medium for children; concepts, principles, methods, and materials.
- 155 Recreational Forms of Dance (3)** Johnson  
The application of theories and teaching concepts to social and recreational forms of dance.
- 156 Dance Pedagogy (3)** Johnson  
Philosophy, concepts, methods, materials, and organizational approaches to teaching dance in academic and nonacademic settings. Prerequisite: TrDa 186.



- 160-61 **Intermediate Ballet (2-2)** Staff  
May be repeated for credit. Prerequisite: TrDa 51 or equivalent.
- 162-63 **Intermediate/Advanced Ballet (2-2)** Staff  
May be repeated for credit. Prerequisite: TrDa 160 or 161 or equivalent.
- 164-65 **Advanced Ballet (2-2)** Staff  
May be repeated for credit. Prerequisite: TrDa 162 or 163 or equivalent.
- 170-71 **Intermediate Modern Dance (2-2)** Staff  
May be repeated for credit. Prerequisite: TrDa 53 or equivalent.
- 172-73 **Intermediate/Advanced Modern Dance (2-2)** Staff  
May be repeated for credit. Prerequisite: TrDa 170 or 171 or equivalent.
- 174-75 **Advanced Modern Dance (2-2)** Staff  
May be repeated for credit. Prerequisite: TrDa 172 or 173 or equivalent.
- 180 **Movement Improvisation (3)** Staff  
Awareness of body movement, environment, group dynamics, performances, and composition through improvisational techniques.
- 182-83 **Dance Composition (3-3)** Withers  
TrDa 182: Basic elements and principles of composition. TrDa 183: Advanced problems in composition. Prerequisite: TrDa 180 or equivalent. (Academic year)
- 184 **Choreography (3)** Withers  
The creation of a dance performance with reference to staging aspects. Prerequisite: TrDa 180, 192, or equivalent; TrDa 131 recommended.
- 186 **Alignment and Movement Analysis (3)** Withers  
Application of principles of anatomy, kinesiology, and physics to the analysis and practice of contemporary dance techniques.
- 190-91 **Dance History (3-3)** Johnson  
History of dance from antiquity to present; emphasis on cultural significance of dance as art, education, and social behavior. (Academic year)
- 192 **Repertory/Performance (1 or 2)** Staff  
Participation in the processes of learning dance repertory and performing dance works. Audition required. May be repeated for credit.
- 193-94 **Dance Styles (arr.)** Staff  
Forms of theatrical dance other than ballet or modern. (Academic year)
- 195 **Selected Topics (3)** Staff  
Topics of current interest in theatre or dance. Topics announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 196 **Independent Study (1 to 6)** Staff  
Independent research and special projects. Open to seniors or exceptionally well-prepared juniors majoring in theatre or dance. Before students are permitted to register for TrDa 196, they must submit a written proposal of the plan of study and obtain approval of the faculty member who is directing the study and the department chair.
- 198 **Internship (3 or 6)** Staff  
Open to seniors majoring in theatre or dance. Work placements with not-for-profit and commercial theatre and dance organizations for an approved number of hours per week. Admission requires departmental approval. May be taken for a maximum of 6 hours. (Fall and spring)
- 199 **Senior Project (3)** Staff  
Open to seniors majoring in theatre or dance. Before students are permitted to register for TrDa 199, they must submit a written proposal of the plan of study and obtain approval of the faculty member who is directing the study and the department chair.

## TOURISM STUDIES

See *Exercise Science and Tourism Studies*.

## UNIVERSITY PROFESSORS

University Professors A. Etzioni, P.J. Caws, S.H. Nasr, K.F. Schaffner, J.N. Rosenau

Courses numbered in the 770s are taught by distinguished scholars who hold appointments as University Professors. With the approval of the department or program concerned,

appropriate University Professor courses may be taken to satisfy degree program requirements. Permission of the University Professor may be required for enrollment. A complete listing of courses offered each semester appears in the *Schedule of Classes* under the 700 series. Following is a list of courses that are expected to be taught fairly regularly by University Professors.

## IAff/PSc

770 **Turbulence in World Politics (3)**

Rosenau

An effort to probe the sources and dynamics of change and continuity in local, national, and international affairs. The links between the orientations of individuals and the actions of collectivities are a major focus, along with the foundations of authority under transformative conditions. For graduate students; open to upper-level undergraduates.

## IAff/PSc

771 **Political Aggregation (3)**

Rosenau

An exploration of how collective action is fashioned out of the input of individuals, how collectivities become larger than the sum of their parts, and how political organizations manage to persist through time. Socialization, mobilization, momentum, and bandwagon effects are among the concepts evaluated. For graduate students; open to upper-level undergraduates.

## HmSc

771 **The Cinema of Morals/The Morals of Cinema (3)**

Caws

Vicarious moral experience in the cinema; examples of such experience in film and the moral arguments they provoke; the power of cinema as a shaper of moral sentiment; moral issues in the production and distribution of films. For graduate students; open to undergraduates.

## Phil

772 **Individualism (3)**

Caws

The concept of the free individual in philosophy, psychology, literature, and politics: individuals and groups; individualism and collectivism; exemplary individuals in biography, autobiography, and fiction; problems of individual and collective agency and identity. For undergraduates; open to graduate students.

## Phil

774 **Understanding Technology (3)**

Caws

The idea of technology—its relation to the sciences and the arts and humanities, its development, and its problems. Technology will not be regarded as merely dependent on the sciences or as merely useful (or dangerous) but as a human activity in its own right, with its own history, conceptual structure, interests, risks, and benefits. For undergraduates; open to graduate students.

## Phil

778 **Left and Right in Philosophy and Politics (3)**

Caws

A fundamental inquiry into the concept of the state in terms of entrenched oppositions: individualism/collectivism, equality/liberty, liberalism/conservatism, socialism/free enterprise, communism/capitalism. Emphasis on the present need to find a constructive transcendence of these oppositions. For undergraduates; open to graduate students.

## Phil

779 **Philosophy and Psychoanalysis (3)**

Caws

An exploration of some striking parallels between the topics addressed by Freud's psychoanalytic theories on the one hand and the traditional content of philosophical reflection on the other, with special emphasis on the relation between cognitive theory and therapeutic practice (in both disciplines). For undergraduates; open to graduate students.

## HCS/Phil

770 **Philosophy of Medicine (3)**

Schaffner

An introduction to philosophical issues in medicine, including the nature of the doctor-patient relationship, whether diseases are objective or socially conditioned entities, clinical reasoning using some simple examples from medical diagnosis and new drug testing, and ethical and social issues raised by the AIDS epidemic. For undergraduates; open to graduate students.



Phil

**771 Philosophy of Biology (3)**

Schaffner

An introduction to philosophical issues in biology, including evolutionary biology (Darwinian, neo-Darwinian, and creationist views), molecular biology and reductionism, teleology, philosophical implications of the neurosciences, socio-biology, and evolutionary ethics. For undergraduates; open to graduate students.

HCS/Phil

**773 Introduction to the Medical Humanities (3)**

Schaffner

Practical ways in which the humanities can assist problem solving in medicine and health care. Philosophical theories of medicine and health care, the role of literature in modeling ethical deliberation, and the roles of religious and humanistic values in a secular decision-making environment. For undergraduates and medical students; open to graduate students.

HCS/Phil

**775 Ethics and Health Policy (3)**

Schaffner

The problem of health care reform, including the question of a "right" to health care (and to long-term care); alternative models of health care delivery; and the issue of health care rationing, focusing on the Oregon proposals. Issues relating to the "right to die," including active and passive euthanasia and doctor-assisted suicide. For graduate students; open to undergraduates.

HCS/Phil

**777 The Human Genome Project: Ethical, Legal, and Social Implications (3)**

Schaffner

Ethical, legal, and social implications of the plan to sequence the entire human genome by the year 2005, including confidentiality of genetic information, genetic discrimination and insurance, reductionistic and deterministic implications of the project, the role of public opinion, and research priorities in health care. For graduates and medical students; open to undergraduates.

Rel

**770 Islamic Civilization and the West (3)**

Nasr

The encounter of Islam and the West, from the rise of Islam to modern times. Investigation of the impact of Islam on European philosophy, science, art, and literature; influence of the West and Western scholarship on the Islamic world. For juniors and seniors; open to graduate students.

Rel

**771 Persian Sufi Literature in East and West (3)**

Nasr

The writings of major Persian Sufi poets and writers, such as Khayyam, Attar, Rumi, Shabistari, and Hafiz, and their impact on the West and on India. The translation of these works into European languages and their influence upon such figures as Goethe and Emerson are discussed. Assigned readings in English. For undergraduates; open to graduate students.

Rel

**772 Mysticism—East and West (3)**

Nasr

A thematic examination of major elements and components of mystical traditions, dealing with such issues as the nature of mysticism, the search for ultimate reality, the mystical significance of the cosmos, the mystical science of the soul, and the significance of sacred art and symbols. Major mystical traditions of East and West—Hinduism, Taoism, Buddhism, Judaism, Christianity, Islam.

Rel

**773 Perennial Philosophy (3)**

Nasr

The idea of perennial philosophy as developed in the 20th century by A. Huxley, A.C. Coomaraswamy, and others. Doctrines and teachings of perennial philosophy as found in various religious and philosophical traditions of East and West. Prerequisite: at least one course in religion, philosophy, or intellectual history. For undergraduates; open to graduate students.

Rel

**775 Man and the Natural Environment (3)**

Nasr

The religious, philosophical, and scientific causes of the present environmental crisis. The history of religious and philosophical attitudes toward nature in the

West, the history of Western science, and some non-Western world views that may encourage a more harmonious relationship between man and the natural environment.

Rel

**777 Religion and Science (3)**

Naar

The interaction between religion and science in ancient Egypt, classical Greece, Islam, India, China, and the West, from the Renaissance, the scientific revolution, and up to the present day. Key concepts and issues in the encounter of religion and science in light of the cultural matrix of the civilization and period in question. For juniors and seniors; open to graduate students.

Soc

**776 Public Policy Research (3)**

Etzioni

Basic concepts of policy research in comparison to basic and applied research. Policy research methods. The social structure of policy research: producers and consumers of knowledge and issues arising among them. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: social science or public policy course work or related experience.

Soc/Econ/PSc

**779 The Elements of Socioeconomics (3)**

Etzioni

A synthesized approach to the study of economic behavior and economic policy, drawing on relevant segments of economics and sociology as well as political science and psychology. A discussion of ethical assumptions and core concepts in the study of micro- and macroeconomic behavior and their policy implications. For graduate students; open to qualified undergraduates.

## WOMEN'S STUDIES

Associate Professors P.M. Palmer, S. Quitslund (Director)  
Associate Professorial Lecturers C.A. Douglas, M. Zavos  
Adjunct Assistant Professor C. Deitch

### Committee on Women's Studies

L. Brandt, C. Burack, M.M. Cassidy, C. Deitch, S. Lynch, E. Marder, P.M. Palmer, S. Quitslund, A. Romines, G. Savage, T. Wallace, P. Wathen, G. Weiss, B. Wolfman

**Minor in women's studies**—Undergraduates who select a minor in women's studies must declare their intention to the director no later than the beginning of their senior year. Students are required to complete at least 18 credit hours for the minor, including two core courses (WStu 120 and 125) and four additional courses, as approved by the advisor. WStu 170 and 183 are strongly recommended.

**120 History of Feminist Thought (3)**

Staff

A multidisciplinary examination of historical conditions, cultural norms, and social institutions that define women's status in Western culture. Experiences of girls and women in various racial-ethnic, class, and age groups. Alternative visions for women's (and, by implication, men's) roles and status. Sophomore standing required. (Spring)

**125 Varieties of Feminist Theory (3)**

Staff

A review, through both classical and contemporary texts, of the variety of feminist explanations of women's status. Relationships within the sex/gender system and arrangements based on class and race. Evaluation, through the lens of feminist theory, of several of the established academic disciplines in the sciences, social sciences, and humanities. (Fall)

**170 Selected Topics (3)**

Staff

Examination and analysis of central issues in women's studies, such as women and difference, women in media, women and violence, women and spirituality, psychoanalysis and women. Topic changes each semester; may be repeated for credit. (Fall and spring)

**181 Women in Western Religion (3)**

Quitslund

Same as Rel 181.



**183 Practicum in Women's Studies (3)****Staff**

Study of the changing status of women through supervised assignment to public and private agencies engaged in policy-making, education, political action, and research. Placement arrangements begin the semester prior to registration for this course.

## FACULTY AND STAFF OF INSTRUCTION 1992-1993

Columbian College and Graduate School of Arts and Sciences

School of Business and Public Management

School of Education and Human Development

School of Engineering and Applied Science

Elliott School of International Affairs

### EMERITI

Caroline Lander Adams, *Professor Emeritus of Botany*

B.A. 1925, Illinois College; M.S. 1928, University of Chicago; Ph.D. 1932, University of Wisconsin

Grover LaMarr Angel, *Professor Emeritus of Education*

B.A. 1929, High Point College; M.A. in Ed. 1946, Ed.D. 1952, George Washington University

Galip Mehmet Arkilic, *Professor Emeritus of Engineering and Applied Science*

B.S. in M.E. 1946, Cornell University; M.S. 1947, Illinois Institute of Technology; Ph.D. 1954, Northwestern University

Robert Edward Baker, *Professor Emeritus of Education*

B.S. in Ed. 1939, State University of New York at Buffalo; M.A. 1954, Catholic University of America; M.A. in Ed. 1956, Ed.D. 1962, George Washington University

Ruth Lillian Aaronson Bari, *Professor Emeritus of Mathematics*

B.A. 1939, City University of New York, Brooklyn College; M.A. 1943, Ph.D. 1966, Johns Hopkins University

Shirley Russell Barnett, *Associate Professor Emeritus of Spanish*

B.A. 1944, Vassar College; M.A. 1946, Vanderbilt University; Ph.D. 1958, University of Minnesota

Lee Sheward Bielski, *Professor Emeritus of Speech Communication*

B.S. 1940, Ohio University; M.A. 1944, University of Michigan

Guy Black, *Professor Emeritus of Business Economics*

B.S. 1941, Harvard University; M.A. 1948, Ph.D. 1951, University of Chicago

Perry Botwin, *Professor Emeritus of Special Education*

B.S. 1942, Rutgers University; M.A. 1947, New York University; Ed.D. 1957, Columbia University

Marcella Brenner, *Professor Emeritus of Education*

B.S. in Ed. 1934, Johns Hopkins University; M.A. 1949, American University; Ed.D. 1962, George Washington University

Harold Frederick Bright, *Professor Emeritus of Statistics; Vice President for Academic Affairs Emeritus*

B.A. 1937, Lake Forest College; M.S. 1944, University of Rochester; Ph.D. 1952, University of Texas

David Springer Brown, *Professor Emeritus of Management*

B.A. 1936, University of Maine at Orono; Ph.D. 1955, Syracuse University

Frederick James Brown, Jr., *Professor Emeritus of Education*

B.A. 1947, M.Ed. 1951, Western Maryland College; Ed.D. 1962, Columbia University

Robert Guy Brown, *Professor Emeritus of Sociology*

B.A. 1949, University of Rhode Island; M.A. 1951, Ph.D. 1960, University of North Carolina

Elizabeth Burtner, *Professor Emeritus of Physical Education*

B.A. 1927, Hood College; M.A. 1935, Columbia University

Willard Edmund Caldwell, *Professor Emeritus of Psychology*

B.A. 1940, M.A. 1941, University of Florida; Ph.D. 1946, Cornell University

Ali Bulent Cambel, *Professor Emeritus of Engineering and Applied Science*

B.S. 1942, Robert College, Turkey; M.S. 1946, California Institute of Technology; Ph.D. 1950, University of Iowa



- Wesley Thomas Carroll, Professor Emeritus of Education**  
B.S. 1933, Iowa State University of Science and Technology; M.A. 1940, Ph.D. 1952, University of Nebraska
- James Harold Coberly, Professor Emeritus of English**  
B.A. 1933, M.A. 1938, Ph.D. 1949, George Washington University
- Mary Ellen Coleman, Professor Emeritus of Education**  
B.S. 1937, Madison College; M.A. in Ed. 1950, George Washington University
- Benjamin Carpenter Cruickshanks, Professor Emeritus of Mechanical Engineering**  
B.S. in M.E. 1920, George Washington University
- Roderic Hollett Davison, Professor Emeritus of European History**  
B.A. 1937, Princeton University; M.A. 1938, Ph.D. 1942, Harvard University
- Roy Brandon Eastin, Professor Emeritus of Business Administration**  
B.A. 1943, M.A. 1945, George Washington University; Ph.D. 1953, American University
- Julian Eisenstein, Professor Emeritus of Physics**  
B.S. 1941, M.A. 1942, Ph.D. 1948, Harvard University
- Lloyd Hartman Elliott, Professor Emeritus of Higher Education; President Emeritus of the University**  
B.A. 1937, Glenville State College; M.A. 1939, LL.D. 1967, West Virginia University; Ed.D. 1948, University of Colorado; LL.D. 1963, University of New Hampshire; LL.D. 1965, Colby College; LL.D. 1966, Concord College; LL.D. 1969, University of Maine at Orono; LL.D. 1970, Husson College; LL.D. 1971, Georgetown University; Litt.D. 1986, West Virginia Institute of Technology; D.H.C. 1988, Kansai University, Japan; LL.D. 1988, American University
- Richard Ferdinand Ericson, Professor Emeritus of Management**  
B.A. 1943, M.B.A. 1948, University of Chicago; Ph.D. 1952, Indiana University
- Joseph Foa, Professor Emeritus of Engineering and Applied Science**  
Dr. Ing. (M.E.) 1931, Polytechnic Institute of Torino, Italy; Dr. Ing. (A.E.) 1933, University of Rome
- Raymond Richard Fox, Professor Emeritus of Engineering and Applied Science**  
B.S. in C.E. 1949, M.S. in C.E. 1952, University of Washington; P.E.
- Lyndale Harpster George, Associate Professor Emeritus of Human Kinetics and Leisure Studies**  
B.S. in P.E. 1948, M.A. in Ed. 1952, A.P.C. 1961, George Washington University
- Marvin Gordon, Professor Emeritus of Geography and Regional Science**  
B.A. 1942, City University of New York, City College; M.A. 1954, Ph.D. 1966, Columbia University
- Samuel W. Greenhouse, Professor Emeritus of Statistics**  
B.S. 1938, City University of New York, City College; M.A. 1954, Ph.D. 1959, George Washington University
- Francis Stanley Grubar, Professor Emeritus of Art**  
B.A. 1948, M.A. 1949, University of Maryland; M.A. 1952, Ph.D. 1966, Johns Hopkins University
- Andrew Gyorgy, Professor Emeritus of International Affairs and Political Science**  
B.A. 1937, J.D. 1938, University of Budapest; M.A. 1939, University of California, Berkeley; Ph.D. 1943, University of California, Los Angeles
- Ira Bowers Hansen, Professor Emeritus of Zoology**  
B.S. 1928, M.A. 1929, Wesleyan University; Ph.D. 1932, University of Chicago
- Robert Bernard Heller, Professor Emeritus of Engineering and Applied Science**  
B.S. 1946, M.S. 1948, Ph.D. 1951, St. Louis University
- Henry William Herzog, Vice President and Treasurer Emeritus**  
B.S. in C.E. 1930, LL.D. 1978, George Washington University
- Philip Henry Highfill, Jr., Professor Emeritus of English**  
B.A. 1942, Wake Forest University; M.A. 1948, Ph.D. 1950, University of North Carolina
- Harold Clendenin Hinton, Professor Emeritus of Political Science and International Affairs**  
B.A. 1946, M.A. 1948, Ph.D. 1951, Harvard University
- Ching-Yao Hsieh, Professor Emeritus of Economics**  
B.A. 1939, St. John's University, China; M.A. 1958, Ph.D. 1964, George Washington University
- Joe Lee Jessup, Professor Emeritus of Business Administration**  
B.S. in B.A. 1936, University of Alabama; M.B.A. 1941, Harvard University, LL.D. 1964, University of Chungang, Korea
- Eva Mayne Johnson, Professor Emeritus of Psychology**  
B.A. 1949, M.A. 1951, Ph.D. 1957, George Washington University

- Kenneth Johnson, Professor Emeritus of Engineering Administration**  
B.A. 1931, Indiana State University; Ph.D. 1937, Purdue University
- Robert Gean Jones, Professor Emeritus of Religion**  
B.A. 1947, Baylor University; B.D. 1950, M.A. 1957, Ph.D. 1959, Yale University
- Samuel Kavruck, Professor Emeritus of Education**  
B.S. 1937, M.S. in Ed. 1939, City University of New York, City College; M.A. in Govt. 1950, Ed.D. 1954, George Washington University
- John Kaye, Professor Emeritus of Engineering and Applied Science**  
B.S. in M.E. 1939, M.S. in M.E. 1948, California Institute of Technology
- John Whitefield Kendrick, Professor Emeritus of Economics**  
B.A. 1937, M.A. 1939, University of North Carolina; Ph.D. 1955, George Washington University
- Robert Wayne Kenny, Professor Emeritus of History**  
B.J. 1953, University of Texas; M.A. 1957, University of Minnesota; Ph.D. 1963, University of Chicago; M.F.A. 1984, George Washington University
- Hewitt Kenyon, Professor Emeritus of Mathematics**  
B.S. 1942, Ph.D. 1954, University of California, Berkeley
- James Cecil King, Professor Emeritus of German**  
B.A. 1949, M.A. 1950, Ph.D. 1954, George Washington University
- Virginia Randolph Kirkbride, Professor Emeritus of Educational Psychology**  
B.A. 1941, M.A. 1942, University of Nebraska; Ed.D. 1959, George Washington University
- Solomon Kullback, Professor Emeritus of Statistics**  
B.S. 1927, City University of New York, City College; M.A. 1929, Columbia University; Ph.D. 1934, George Washington University
- Frederick Charles Kurtz, Professor Emeritus of Accountancy**  
B.S. in Com. 1948, University of Virginia; M.B.A. 1949, University of Pennsylvania; C.P.A. 1952, State of Maryland
- Thelma Z. Lavine, Elton Professor Emeritus of Philosophy**  
B.A. 1936, Radcliffe College; M.A. 1937, Ph.D. 1939, Harvard University
- Hugh Linus LeBlanc, Professor Emeritus of Political Science and Public Affairs**  
B.A. 1948, Louisiana State University and Agricultural and Mechanical College; M.A. 1950, University of Tennessee, Knoxville; Ph.D. 1958, University of Chicago
- Sar Levitan, Professor Emeritus of Economics**  
B.S.S. 1937, City University of New York, City College; M.A. 1939, Ph.D. 1949, Columbia University
- Joseph Benjamin Levy, Professor Emeritus of Chemistry**  
B.S. 1943, University of New Hampshire; M.S. 1945, Ph.D. 1948, Harvard University
- Ralph Kepler Lewis, Professor Emeritus of Anthropology**  
B.A. 1934, Southwest Missouri State College; M.A. 1939, University of Southern California; Ph.D. 1967, Columbia University
- Calvin Darlington Linton, Professor Emeritus of English; Dean Emeritus of Columbian College of Arts and Sciences**  
B.A. 1935, George Washington University; M.A. 1939, Ph.D. 1940, Johns Hopkins University
- Thomas Phillip George Liverman, Professor Emeritus of Mathematics**  
B.A. 1941, University of Montpelier, France; M.A. 1948, Ph.D. 1956, University of Pennsylvania
- Norma Maine Loeser, Professor Emeritus of Management**  
B.A. 1958, M.B.A. 1967, D.B.A. 1971, George Washington University
- William Francis Edward Long, Professor Emeritus of Economics**  
B.A. 1946, M.A. 1947, Ph.D. 1967, George Washington University
- William Allan MacDonald, Professor Emeritus of Art and Archaeology**  
B.A. 1940, Oberlin College; M.A. 1942, Ph.D. 1943, Johns Hopkins University
- Eugene Ross Magruder, Associate Professor Emeritus of Business Administration**  
B.B.A. 1950, M.B.A. 1951, University of Texas; Ph.D. 1959, Ohio State University
- Anthony Marinaccio, Professor Emeritus of Education**  
Ed.B. 1937, Central Connecticut State College; M.A. 1939, Ohio State University; Ph.D. 1949, Yale University; LL.D. 1961, Parsons College
- Muriel Hope McClanahan, Associate Professor Emeritus of English**  
B.A. 1935, Colorado College; M.A. 1937, Ph.D. 1940, University of Pittsburgh
- Margaret McIntyre, Professor Emeritus of Education**  
B.S. in Ed. 1939, State University of New York at Buffalo; M.A. 1944, Northwestern University; A.P.C. 1963, George Washington University
- Florence Marie Mears, Professor Emeritus of Mathematics**  
B.A. 1917, Goucher College; M.A. 1924, Ph.D. 1927, Cornell University



- Franz Henry Michael, Professor Emeritus of International Affairs and Far Eastern History**  
Sinological Diploma 1930, University of Berlin; Referendar 1931, Dr.Jur. 1933, University of Freiburg
- Clarence Cowan Mondale, Professor Emeritus of American Civilization**  
B.A. 1947, Macalester College; M.A. 1954, Ph.D. 1960, University of Minnesota
- James Norman Mosél, Professor Emeritus of Psychology**  
B.A. 1940, Colgate University; M.A. 1941, Columbia University
- Leonard Nadler, Professor Emeritus of Human Resource Development and Adult Education**  
B.B.A. 1948, M.S. 1950, City University of New York, City College; Ed.D. 1962, Columbia University
- Charles Rudolph Naeser, Professor Emeritus of Chemistry**  
B.S. 1931, University of Wisconsin; M.S. 1933, Ph.D. 1935, University of Illinois
- Nadine Nadeshda Natov, Professor Emeritus of Russian**  
M.A. 1939, Ph.D. 1941, Pedagogical Institute of Modern Languages, U.S.S.R.; Ph.D. 1969, University of Michigan
- David Nelson, Professor Emeritus of Mathematics**  
B.A. 1939, M.A. 1940, Ph.D. 1946, University of Wisconsin
- Benjamin Nimer, Professor Emeritus of Political Science and International Affairs**  
B.A. 1942, Ph.D. 1953, University of Chicago
- Harry Robert Page, Professor Emeritus of Business Administration**  
B.A. 1941, Michigan State University; M.B.A. 1950, Harvard University; Ph.D. 1966, American University
- Kittie Fenley Parker, Professor Emeritus of Botany**  
B.A. 1930, M.A. 1932, University of California, Berkeley; Ph.D. 1946, University of Arizona
- Theodore Peter Perros, Professor Emeritus of Chemistry and of Forensic Sciences**  
B.S. 1946, M.S. 1949, Ph.D. 1952, George Washington University
- Ruth Irene Peterson, Professor Emeritus of Education**  
B.S. 1945, State University of New York at Buffalo; M.S. 1946, Syracuse University; Ph.D. 1971, American University
- Vladimir Petrov, Professor Emeritus of International Affairs**  
M.A. 1961, Ph.D. 1965, Yale University
- Ewing Lakin Phillips, Professor Emeritus of Psychology**  
B.S. 1937, Central Missouri State College; M.A. 1940, University of Missouri; Ph.D. 1949, University of Minnesota
- Francisco Prats, Professor Emeritus of Physics**  
Licenciado en Ciencias Fisico 1946, University of Madrid; Ph.D. 1958, University of Maryland
- William Martin Reynolds, Chauncey M. DePew Professor Emeritus of Public Speaking**  
B.A. 1950, Wichita State University; M.A. 1957, Ph.D. 1960, University of Florida
- James Willis Robb, Professor Emeritus of Romance Languages**  
B.A. 1939, Colgate University; M.A. 1950, Middlebury College; Ph.D. 1958, Catholic University of America
- Daniel David Roman, Professor Emeritus of Management Science**  
B.S. in B.A. 1949, M.A. 1953, Ph.D. 1956, University of Southern California
- Sam Rothman, Professor Emeritus of Engineering Administration**  
B.S. 1943, Long Island University; M.A. 1954, Ph.D. 1959, American University
- Robert Clinton Rutledge, Associate Professor Emeritus of English**  
B.A. 1940, University of Virginia; M.A. 1957, Ph.D. 1966, George Washington University
- Homer Belk Sewell, Professor Emeritus of Engineering Management**  
B.S. 1945, U.S. Naval Academy; M.E.A. 1958, George Washington University; M.A. 1975, Ph.D. 1978, University of Lancaster
- William Edward Schmidt, Professor Emeritus of Chemistry**  
B.S. 1943, M.S. 1950, George Washington University; M.A., Ph.D. 1953, Princeton University
- Robert Poindexter Sharkey, Professor Emeritus of Economic History**  
B.A. 1948, Princeton University; Ph.D. 1958, Johns Hopkins University
- Suzanne Lee Simons, Associate Professor Emeritus of Anthropology**  
B.A. 1948, Ohio State University; M.A. 1964, Ph.D. 1969, University of New Mexico
- Herbert Ernest Smith, Professor Emeritus of Engineering Administration**  
B.S. 1930, C.E. 1932, City University of New York, City College; M.S. 1936, Ph.D. 1940, New York University

**Jeanne Ellen Snodgrass, Professor Emeritus of Human Kinetics and Leisure Studies**

B.A. 1952, Ohio Wesleyan University; M.S. in P.E. 1953, Smith College; Ed.D. 1975, University of North Carolina at Greensboro

**Waldo Sommers, Professor Emeritus of Public Administration**

B.A. 1927, Heidelberg College; M.A. 1934, Ph.D. 1948, Yale University

**Loretta May Stallings, Professor Emeritus of Human Kinetics and Leisure Studies**

B.A. 1947, Stanford University; M.A. 1950, University of the Pacific; Ed.D. 1965, University of Texas

**George Stambuk, Professor Emeritus of International Affairs**

M.A. 1956, Ph.D. 1961, Indiana University

**Daniel Jean Stanley, Research Professor of Geology**

B.S. 1956, Cornell University; M.S. 1958, Brown University; D.Sc. 1961, University of Grenoble, France

**George Steiner, Professor Emeritus of Music**

B.S. 1938, Mus.B. 1938, Mus.M. 1940, Johns Hopkins University

**Charles Todd Stewart, Jr., Professor Emeritus of Economics**

B.A. 1946, M.A. 1948, Ph.D. 1954, George Washington University

**Karl Ernest Stromsem, Professor Emeritus of Public Administration**

B.A. 1930, Pomona College; Ph.D. 1935, University of California, Berkeley

**Choy-Tak Taam, Professor Emeritus of Mathematics**

B.S. 1942, University of Illinois; M.A. 1943, Ph.D. 1945, Harvard University

**Ira Rockwood Telford, Professor Emeritus of Anatomy**

B.A. 1931, M.A. 1933, University of Utah; Ph.D. 1942, George Washington University

**Raymond Edward Thomas, Associate Professor Emeritus of Statistics**

B.A. 1955, M.A. 1957, M.Phil. 1971, George Washington University

**Ronald Bettes Thompson, Professor Emeritus of European History**

B.A. 1935, Yale University; Ph.D. 1954, University of Chicago

**Neil Avrill Tilkens, Associate Professor Emeritus of Music**

Mus.B. 1950, Columbia Union College; Mus.M. 1952, Philadelphia Conservatory of Music

**Rodney Tillman, Professor Emeritus of Education**

B.A. 1943, Henderson State College; M.A. 1949, Ed.D. 1955, Columbia University

**Kathryn Mildred Towne, Professor Emeritus of Home Economics**

B.S. 1923, Montana State University; M.A. 1930, Columbia University

**William Lewis Turner, Associate Professor Emeritus of English**

B.A. 1934, M.A. 1941, Ph.D. 1952, University of Pennsylvania

**Curtis Edward Tuthill, Associate Professor Emeritus of Psychology**

B.A. 1935, Macalester College; M.A. 1936, Ph.D. 1939, University of Iowa

**Richard David Walk, Professor Emeritus of Psychology**

B.A. 1942, Princeton University; M.A. 1947, University of Iowa; M.A. 1949, Ph.D. 1951, Harvard University

**Robert Louis Weintraub, Professor Emeritus of Botany**

B.S. 1931, M.A. 1933, Ph.D. 1938, George Washington University

**Edward Ronald Weismiller, Professor Emeritus of English**

B.A. 1938, Litt.D. 1953, Cornell College; M.A. 1942, Harvard University; D.Phil. 1950, Oxford University

**Warren Reed West, Professor Emeritus of Political Science**

B.A. 1918, George Washington University; Ph.D. 1922, Johns Hopkins University

**Ralph Kirby White, Professor Emeritus of Social Psychology**

B.A. 1929, Wesleyan University; Ph.D. 1937, Stanford University

**Robert Crumpton Willson, Associate Professor Emeritus of Journalism**

B.A. 1951, George Washington University

**Marvin Milton Wofsey, Professor Emeritus of Management**

B.S. 1935, New York University; M.A. 1943, Ph.D. 1967, American University

**Lawrence Winkler, Professor Emeritus of Counseling**

B.S. 1952, M.A. 1954, Washington University; Ed.D. 1965, George Washington University

**Helen Bates Yakobson, Professor Emeritus of Russian**

B.S. 1935, Harbin Law School, Manchuria

**Donnell Brooks Young, Professor Emeritus of Zoology**

B.S. 1911, Amherst College; Ph.D. 1923, Columbia University

**Shao Wen Yuan, Professor Emeritus of Engineering and Applied Science**

B.S. 1936, University of Michigan; M.S. 1937, Ph.D. 1941, California Institute of Technology; Ae.E. 1939, Stanford University



## ACTIVE

**Eugene Abravanel, Professor of Psychology**

B.A. 1955, University of Michigan; M.A. 1960, Swarthmore College; Ph.D. 1965, University of California, Berkeley

**Achilles Grammenos Adamantiades, Adjunct Professor of Engineering**

Diploma 1957, National Polytechnic, Greece; Ph.D. 1966, Massachusetts Institute of Technology

**Joseph Morris Aein, Adjunct Professor of Engineering**

B.S. 1958, Massachusetts Institute of Technology; M.S.E.E. 1958, Ph.D. 1962, Purdue University

**Hugh Lecaine Agnew, Associate Professor of History and International Affairs**

B.A. 1975, Queen's University at Kingston, Canada; M.A. 1976, Ph.D. 1981, Stanford University

**Karen Ahlquist, Assistant Professor of Music**

B.A. 1970, Mount Holyoke College; M.A. 1983, University of Connecticut; Ph.D. 1991, University of Michigan

**Mohamed Abd El-Aziz Ahmed, Associate Professorial Lecturer in Engineering**

B.S. 1976, Diploma 1980, Helwan University, Egypt; M.S. 1983, D.Sc. 1988, George Washington University

**Yoshio Akiyama, Professorial Lecturer in Mathematics**

M.A. 1963, Andrews University; Ph.D. 1967, University of Minnesota

**John D. Albertson, Adjunct Assistant Professor of Music**

B.M. 1981, Catholic University of America

**Marshall W. Alcorn, Jr., Associate Professor of English**

B.A. 1970, Texas Lutheran College; M.A. 1976, Vanderbilt University; Ph.D. 1981, University of Texas

**Charles Alexander, Jr., Adjunct Professor of Engineering**

B.S. 1962, Lowell Technological Institute; M.S. 1965, University of New Hampshire; Ph.D. 1973, University of Maryland

**Nikitas Anestis Alexandridis, Professor of Engineering and Applied Science**

B.S.E.E. 1966, Ohio University; M.S. 1967, Ph.D. 1971, University of California, Los Angeles

**Catherine Jean Allen, Professor of Anthropology**

B.A. 1969, St. John's College, Maryland; M.A. 1972, Ph.D. 1978, University of Illinois

**Andrew Altman, Associate Professor of Philosophy**

B.A. 1972, M.Phil. 1975, Ph.D. 1977, Columbia University

**Frederick Amling, Professor of Business Finance**

B.A. 1948, Baldwin-Wallace College; M.B.A. 1949, Miami University; Ph.D. 1957, University of Pennsylvania

**Jeffrey Clifford Anderson, Professor of Art**

B.A. 1970, University of Pittsburgh; M.F.A. 1973, Ph.D. 1976, Princeton University

**Lowell Bruce Anderson, Professorial Lecturer in Engineering**

B.E.S. 1965, Johns Hopkins University; M.S. 1968, Ph.D. 1971, Northwestern University

**Avery Delano Andrews, Associate Professor of History; Assistant Dean of Columbian College and Graduate School of Arts and Sciences**

B.A. 1950, Harvard University; LL.B. 1953, M.A. 1958, Ph.D. 1962, University of Pennsylvania

**Garth R. Andrus, Assistant Professor of Human Services**

B.S. 1984, M.A. 1986, Brigham Young University; Ed.D. 1988, Vanderbilt University

**Charles Anello, Professorial Lecturer in Engineering**

B.S. 1958, Towson State University; Sc.M. 1962, Sc.D. 1964, Johns Hopkins University

**Richard D. Angelari, Associate Professorial Lecturer in Engineering**

B.E.E. 1956, M.E.E. 1963, Polytechnic University; Ph.D. 1975, New York University

**Ricardo Anzola-Betancourt, Adjunct Professor of Travel and Tourism**

B.Arch. 1969, Cornell University

**Ernest Stokes Armstrong, Assistant Professorial Lecturer in Engineering**

B.S. 1959, M.S. 1961, Clemson University; Ph.D. 1967, North Carolina State University

**John Martin Artz, Assistant Professor of Management Science**

B.S. 1974, James Madison University; M.S. 1976, University of Florida; M.B.A. 1981, Ph.D. 1990, George Washington University

**Joseph Aschheim, Professor of Economics**

B.A. 1951, University of California, Berkeley; M.A. 1953, Ph.D. 1954, Harvard University

**Hossein G. Askari, Professor of International Finance**

B.S. 1966, Ph.D. 1970, Massachusetts Institute of Technology

**Clifford J. Astill, Professorial Lecturer in Engineering**

B.E. 1958, University of Queensland; M.S. 1968, D.Sc. 1971, Columbia University

**Muriel Ann Atkin, Associate Professor of History**

B.A. 1967, Sarah Lawrence College; M.Phil. 1971, Ph.D. 1976, Yale University

**David Lynn Atkins, Professor of Biology**

B.A. 1957, University of Texas, M.A. 1963, East Texas State University; Ph.D. 1970, Texas A&M University

**Ines Azar, Professor of Spanish**

M.A. 1969, Ph.D. 1974, Johns Hopkins University

**Murat Azizoglu, Assistant Professor of Engineering and Applied Science**

B.S. 1985, Middle East Technical University, Turkey; M.S. 1987, Ohio State University; Ph.D. 1991, Massachusetts

**William R. Baber, Benjamin Franklin Professor of Accountancy**

B.S. 1969, Bucknell University; M.B.A. 1973, University of Pittsburgh; Ph.D. 1980, University of North Carolina

**William Back, Adjunct Professor of Geology**

B.S. 1948, University of Illinois, M.S. 1955, University of California, Berkeley; M.P.A. 1956, Harvard University; Ph.D. 1969, University of Nevada

**Mary Jo Baedecker, Assistant Professorial Lecturer in Geology**

B.A. 1964, Vanderbilt University; M.S. 1967, University of Kentucky; Ph.D. 1985, George Washington University

**Prabir K. Bagchi, Associate Professor of Business Administration**

B.S. 1969, University of Calcutta, India; M.S. 1984, Ph.D. 1986, University of Tennessee

**Frank E. Baginski, Associate Professor of Mathematics**

B.S. 1975, Gannon University; M.S. 1977, Purdue University; Ph.D. 1985, University of Massachusetts

**Mary Ann Baily, Adjunct Associate Professor of Economics**

B.A. 1964, Radcliffe College; M.A. 1968, Northwestern University; Ph.D. 1974, Massachusetts Institute of Technology

**Raymond P. Bain, Associate Research Professor of Statistics**

B.A. 1975, Franklin and Marshall College; Ph.D. 1981, Emory University

**Robert Preston Baker, Adjunct Assistant Professor of Music**

B.Mus. 1979, Lebanon Valley College; M.M. 1988, D.M.A. 1990, Catholic University of America

**Mary Burns Bandas, Assistant Professor of English as a Foreign Language**

B.S. 1961, Le Moyne College; M.A. 1973, New York University

**Judith Banister, Professorial Lecturer in Geography and Regional Science**

B.A. 1965, Swarthmore College; Ph.D. 1978, Stanford University

**Lori Barnett, Adjunct Instructor in Cello**

B.A. 1973, Bennington College

**Albert Barnhart, Associate Professorial Lecturer in Art**

B.A. 1970, University of Maryland; M.A. 1974, State University of New York College at Oswego

**Theodore M. Barnhill, Professor of Finance**

B.S. 1968, Tennessee Technological University; M.S. 1969, M.B.A. 1971, Ph.D. 1974, University of Michigan

**Richard Walker Barnwell, Professorial Lecturer in Engineering**

B.S. 1961, M.S. 1962, Auburn University; Ph.D. 1968, Virginia Polytechnic Institute and State University

**Nicholas L. Basdekas, Professorial Lecturer in Engineering**

B.S. 1954, M.S. 1955, C.E. 1958, Columbia University; Ph.D. 1969, Catholic University of America

**J. Howard Beales III, Associate Professor of Strategic Management and Public Policy**

B.A. 1972, Georgetown University; Ph.D. 1978, University of Chicago

**Lucille Bluso Beck, Associate Professorial Lecturer in Speech and Hearing**

B.A. 1971, Adelphi University; M.A. 1973, Ph.D. 1978, University of Maryland

**Robert S. Becker, Associate Professorial Lecturer in Journalism**

B.A. 1970, George Washington University; J.D. 1982, University of Connecticut

**William H. Becker, Professor of History**

B.A. 1964, Muhlenberg College; Ph.D. 1969, Johns Hopkins University

**Nabih Elias Bedewi, Associate Professor of Engineering and Applied Science**

B.S. 1983, M.S. 1984, Ph.D. 1986, University of Maryland

**David Booth Beers, Assistant Professorial Lecturer in Classics**

B.A. 1957, Trinity College (Connecticut); LL.B., M.A. 1960, University of California, Berkeley

**Faye Z. Belgrave, Associate Professor of Psychology**

B.S. 1972, North Carolina Agricultural and Technical State University; M.A. 1974, University of Nebraska; Ph.D. 1982, University of Maryland



- Nancy L. Benco, Associate Professorial Lecturer in Anthropology**  
B.A. 1966, Wittenberg University; M.A. 1981, George Washington University; Ph.D. 1986, State University of New York at Binghamton
- Cornelius Bennhold, Assistant Professor of Physics**  
B.S. 1981, B.S. 1982, Mainz University, Germany; Ph.D. 1987, Ohio University
- John William Benoit, Professorial Lecturer in Engineering**  
B.S. 1952, University of Washington; M.S. 1954, North Carolina State University at Raleigh; Ph.D. 1961, Princeton University
- Otto Bergmann, Professor of Physics**  
Ph.D. 1949, University of Vienna
- Simon Y. Berkovich, Professor of Engineering and Applied Science**  
M.S. 1960, Moscow Physical-Technical Institute, U.S.S.R.; Ph.D. 1964, Institute of Precise Mechanics and Computer Technology, U.S.S.R.
- Edward David Berkowitz, Professor of History**  
B.A. 1972, Princeton University; M.A. 1973, Ph.D. 1976, Northwestern University
- Barry Louis Berman, Professor of Physics**  
B.A. 1957, Harvard University; M.S. 1959, Ph.D. 1963, University of Illinois
- Barnes Reed Bierck, Assistant Professor of Engineering and Applied Science**  
B.S. 1972, M.Eng. 1981, Rensselaer Polytechnic University; M.Sc. 1975, Tulane University; Ph.D. 1988, Cornell University
- Robert Michael Birch, Adjunct Instructor in Trumpet**  
B.Mus. 1976, University of New Hampshire; M.Mus. 1978, Ohio State University; D.M.A. 1991, Catholic University of America
- Mitat A. Birkan, Professorial Lecturer in Engineering**  
B.S. 1973, M.S. 1975, Technical University of Istanbul; Ph.D. 1984, University of Colorado
- Laura N. Birou, Assistant Professor of Logistics and Operations Management**  
B.A. 1982, M.B.A. 1983, Ph.D. 1992, Michigan State University
- William Thomas Bisignani, Professorial Lecturer in Engineering**  
B.S. 1961, M.S. 1962, Ph.D. 1972, Rutgers University
- David Bjelajac, Associate Professor of Art**  
B.A. 1972, M.A. 1973, University of Wisconsin; Ph.D. 1980, University of North Carolina
- Peter S. Bock, Professor of Engineering**  
B.A. 1962, Ripon College; M.S. 1964, Purdue University
- William James Boettinger, Professorial Lecturer in Engineering**  
B.E.S. 1968, Ph.D. 1972, Johns Hopkins University
- Jody Bolz, Adjunct Assistant Professor in English**  
B.A. 1971, M.F.A. 1973, Cornell University
- Joseph Edmond Bonin, Assistant Professor of Mathematics**  
B.A. 1984, Assumption College; M.A. 1986, Ph.D. 1989, Dartmouth College
- Giorgio Vittorio Borgiotti, Professor of Engineering and Applied Science**  
Eng.Dr. 1957, University of Rome, Italy
- Gerald Michael Borsuk, Professorial Lecturer in Engineering**  
B.S. 1966, M.S. 1969, Ph.D. 1972, Georgetown University
- Sudip Bose, Assistant Professor of Statistics**  
B.Sc. 1982, Calcutta University, India; M.S. 1984, Indian Statistical Institute, India; Ph.D. 1990, Purdue University
- Bryan L. Boulter, Professor of Economics**  
B.A. 1967, North Carolina State University; M.A. 1969, Ph.D. 1974, Princeton University
- George McMillan Bowles, Adjunct Associate Professor of Philosophy**  
B.A. 1966, University of Denver; Ph.D. 1970, Stanford University
- Roland Lee Bowles, Associate Professorial Lecturer in Engineering**  
B.S. 1959, Randolph-Macon College; M.S. 1961, Ph.D. 1971, University of Virginia
- Kenneth R. Bowling, Adjunct Associate Professor of History**  
B.A. 1962, Dickinson College; M.A. 1964, Ph.D. 1968, University of Wisconsin
- Lloyd Spencer Bowling, Professor of Speech and Hearing**  
B.A. 1954, M.A. 1957, Ed.D. 1964, University of Maryland
- George Robert Bozzini, Associate Professor of English**  
B.S. 1961, Ph.D. 1971, Georgetown University
- Michael D. Bradley, Professor of Economics**  
B.S. 1975, University of Delaware; Ph.D. 1982, University of North Carolina
- Linda J. Brandt, Associate Professor of Psychology**  
B.A. 1963, Elmhurst College; M.A. 1965, Clark University; Ph.D. 1973, University of London

- Jacob I. Bregman, Professorial Lecturer in Engineering**  
B.S. 1943, Providence College; M.S. 1948, Ph.D. 1951, Polytechnic University
- Alan L. Breitler, Associate Professorial Lecturer in Engineering**  
B.A. 1960, Florida State University; M.A. in Ed. 1966, George Washington University; Ph.D. 1975, Catholic University of America
- Michael Keith Brett-Surman, Assistant Professorial Lecturer in Geology**  
B.A. 1968, University of Colorado; M.A. 1975, University of California; M.A. 1979, Johns Hopkins University; M.Phil. 1985, George Washington University
- Mary Diane Majerus Brewer, Associate Professor of Speech and Hearing**  
B.A. 1963, M.A. 1965, University of Iowa
- William John Briscoe, Associate Professor of Physics**  
B.A. 1970, Ph.D. 1978, Catholic University of America; M.A. 1972, Northeastern University
- James Thomas Broach, Associate Professorial Lecturer in Physics**  
B.S. 1969, Louisiana State University; M.S. 1975, Ph.D. 1981, American University
- Joseph B. Bronder, Assistant Professorial Lecturer in Engineering**  
B.S. 1955, University of Dayton; M.A. 1957, Washington University; Ph.D. 1965, University of Arizona
- Alison Spence Brooks, Professor of Anthropology**  
B.A. 1965, Radcliffe College; M.A. 1967, Ph.D. 1979, Harvard University
- Kenneth Michael Brown, Associate Professor of Biology and of Genetics**  
B.S. 1973, Ph.D. 1982, Michigan State University; M.S. 1975, University of Florida
- Nathan Jude Brown, Associate Professor of Political Science and International Affairs; Associate Dean of the Elliot School of International Affairs**  
B.A. 1980, University of Chicago; M.A. 1983, Ph.D. 1986, Princeton University
- Debra Ann Bruno, Adjunct Instructor in English**  
B.A. 1979, State University of New York at Oneonta; M.A. 1981, Boston College
- Sarah Katherine Bryant, Assistant Professor of Finance**  
B.S. 1979, Ph.D. 1985, University of South Carolina
- Cynthia Burack, Assistant Professor of Political Science**  
B.A. 1981, West Virginia University; M.A. 1987, Ph.D. 1991, University of Maryland
- Ben Burdetsky, Professor of Personnel and Labor Relations and of Public Administration**  
B.S. 1950, M.S. 1958, Temple University; Ph.D. 1968, American University
- Legand L. Burge, Associate Professorial Lecturer in Engineering**  
B.S. 1972, M.S. 1973, Ph.D. 1979, Oklahoma State University
- Lee Burke, Assistant Professor of Business Administration**  
B.A. 1979, University of California; M.S.M. 1982, Purdue University; Ph.D. 1990, University of California
- James Franklin Burks, Professor of French**  
B.A. 1951, M.A. 1952, University of Cincinnati; Ph.D. 1957, Indiana University
- John Robert Burns, Associate Professor of Zoology**  
B.S. 1968, City University of New York, Brooklyn College; M.S. 1972, Ph.D. 1974, University of Massachusetts
- William Dickinson Burrows, Associate Professorial Lecturer in Engineering**  
B.A. 1953, Cornell University; Ph.D. 1956, Stanford University; M.S. 1973, Vanderbilt University
- Robert L. Butterworth, Adjunct Professor of International Affairs and Political Science**  
B.A. 1967, University of Washington; M.A. 1969, Ph.D. 1973, University of California, Berkeley
- Susan J. Callaway, Instructor in English**  
B.A. 1981, University of Wisconsin; M.A. 1983, Brown University
- Linda A. Camino, Assistant Research Professor of Anthropology**  
B.A. 1979, M.A. 1980, Ph.D. 1986, University of Virginia
- Robert D. Caplan, Professor of Psychology and of Psychiatry and Behavioral Sciences**  
B.A. 1964, University of California, Los Angeles; M.S. 1966, San Francisco State University; Ph.D. 1971, University of Michigan
- Yvonne Captain-Hidalgo, Assistant Professor of Spanish**  
B.A. 1973, Pitzer College; M.A. 1976, University of California, Los Angeles; Ph.D. 1984, Stanford University
- Michael F. Card, Professorial Lecturer in Engineering**  
B.S. 1959, Massachusetts Institute of Technology; M.S. 1964, Ph.D. 1970, Virginia Polytechnic Institute and State University



- Edward Alan Caress, Professor of Chemistry; Associate Dean of Columbian College and Graduate School of Arts and Sciences**  
B.A. 1958, Dartmouth College; Ph.D. 1963, University of Rochester
- Caren M. Carney, Assistant Professorial Lecturer in Psychology**  
B.A. 1973, Marywood College; M.A. in Sp.St. 1978, Ph.D. 1985, George Washington University
- Robert L. Carroll, Jr., Professor of Engineering and Applied Science**  
B.S. 1967, North Carolina State University at Raleigh; M.Phil. 1970, Yale University; Ph.D. 1973, University of Connecticut
- Thomas Frank Carroll, Adjunct Professor of Economics**  
B.A. 1942, Case Western Reserve University; M.S. 1947, Ph.D. 1950, Cornell University
- Barbara Gilbert Carson, Associate Professorial Lecturer in American Civilization and in Art History**  
B.A. 1963, Brown University; M.A. 1965, University of Delaware
- John H. Carson, Professor of Management Science**  
B.S. in E.E. 1969, M.S. 1970, Ph.D. 1976, Lehigh University
- Donna Marie Carter, Instructor in English**  
B.A. 1978, M.A. 1984, George Washington University
- Geoffrey Carter, Associate Professor of English**  
B.A. 1963, Cambridge University; Ph.D. 1969, University of Pennsylvania
- James Butler Carter, Associate Professor of Naval Science**  
B.S. 1970, U.S. Naval Academy; M.S. 1982, Naval Postgraduate School
- John Brian Cashmere, Assistant Professor of Naval Science**  
B.A. 1986, M.B.A. 1986, University of Rochester
- Peter James Caws, University Professor of Philosophy**  
B.Sc. 1952, University of London; M.A. 1954, Ph.D. 1956, Yale University
- Neal Eric Chalofsky, Associate Professor of Human Resource Development**  
B.S. 1966, Temple University; M.B.A. 1968, American University; Ed.D. 1976, George Washington University
- William J. Chambliss, Professor of Sociology**  
B.A. 1955, University of California, Los Angeles; M.A. 1960, Ph.D. 1962, Indiana University
- Promod Chandhok, Assistant Professorial Lecturer in Statistics**  
B.A. 1972, M.A. 1974, Lucknow University, India; M.S. 1978, Ph.D. 1982, Iowa State University
- Jonathan Chaves, Professor of Chinese**  
B.A. 1965, City University of New York, Brooklyn College; M.A. 1966, Ph.D. 1971, Columbia University
- Chun-houh Chen, Assistant Professor of Statistics**  
B.A. 1984, National Chung Hsing University, Taiwan; M.A. 1990, Ph.D. 1991, University of California, Los Angeles
- Mike C. Chen, Associate Professorial Lecturer in Engineering**  
B.S. 1969, National Tsing-Hua University, Taiwan; M.S. 1972, Ph.D. 1975, Kansas State University
- Hyeong-Ah Choi, Associate Professor of Engineering and Applied Science**  
B.A. 1980, M.S. 1982, Seoul National University, Korea; Ph.D. 1986, Northwestern University
- Patricia Chu, Assistant Professor of English**  
B.A. 1981, Yale University; M.A. 1989, Ph.D. 1992, Cornell University
- Robert Paul Churchill, Professor of Philosophy**  
B.A. 1969, M.A. 1972, Ph.D. 1975, Johns Hopkins University
- Maxine D. Clair, Assistant Professor of English**  
B.S. 1963, University of Kansas; M.F.A. 1984, American University
- Rolf Hans Clark, Adjunct Professor of Engineering**  
B.S. 1959, Yale University; M.S. 1966, Naval Postgraduate School; Ph.D. 1976, University of Massachusetts
- Anthony George Coates, Research Professor of Geology**  
B.S. 1959, Ph.D. 1963, University of London
- David William Coder, Adjunct Professor of Engineering**  
B.S. 1957, Ph.D. 1973, University of Maryland
- Mary Ann Bieter Coffland, Associate Professor of Romance Languages**  
B.A. 1952, College of St. Catherine; M.A. 1957, Ph.D. 1965, University of Minnesota
- Debra Jo Cohen, Associate Professor of Management Science**  
B.Sc. 1979, Ohio University; M.L.H.R. 1982, Ph.D. 1987, Ohio State University
- Neil Goodman Cohen, Associate Professor of Finance**  
B.A. 1963, Olivet College; M.B.A. 1964, University of Michigan; D.B.A. 1975, University of Virginia
- Robert Long Combs, Associate Professor of English**  
B.A. 1968, University of Southern Mississippi; Ph.D. 1971, University of South Carolina

- Frank Bernard Conlon, Adjunct Assistant Professor of Music**  
B.M. 1967, M.M. 1969, Catholic University of America
- Joseph Crockett Connell, Adjunct Instructor in Percussion**  
B.Mus. 1984, George Mason University
- James P. Connelly, Assistant Research Professor of Physics**  
B.A. 1975, Saint Mary's College; B.S. 1981, Morgan State University; Ph.D. 1989, University of New Hampshire
- Patrice Connerton, Assistant Professor of English as a Foreign Language**  
B.A. 1975, M.A.T. 1977, Georgetown University
- Joel W. Cook, Associate Professor of Business Administration**  
B.S. 1971, Oklahoma State University; M.B.A. 1974, University of Tulsa; D.B.A. 1981, Indiana University
- Patrick Cook, Assistant Professor of English**  
B.A. 1979, M.A. 1982, University of California
- Suzanne Durling Cook, Adjunct Instructor in Travel and Tourism**  
B.S. 1973, University of Maryland; M.A. 1982, George Washington University
- James Cameron Coolbaugh, Associate Professorial Lecturer in Engineering**  
B.S. 1965, California State University at Long Beach; Ph.D. 1974, Baylor College of Medicine
- Joseph John Cordes, Professor of Economics**  
B.A. 1971, Stanford University; M.S. 1975, Ph.D. 1977, University of Wisconsin
- Constance Christian Costigan, Professor of Design**  
B.S. 1957, Simmons College; M.A. 1965, American University
- Thomas Francis Courtless, Jr., Professor of Law and Sociology**  
B.A. 1955, Pennsylvania State University; M.A. 1960, Ph.D. 1966, University of Maryland
- Hugh George Courtney, Assistant Professor of Economics**  
B.A. 1985, Northwestern University; Ph.D. 1991, Massachusetts Institute of Technology
- Andrea Jean Covarrubias, Assistant Professor of English as a Foreign Language**  
B.A. 1974, University of Pittsburgh; M.Ed. 1978, Temple University
- Craig A. Cox, Instructor in Naval Science**  
B.S. 1985, U.S. Naval Academy
- John Patrick Coyne, Associate Professor of Management Science**  
B.S. 1967, Iowa College; M.S. 1968, Ph.D. 1970, Lehigh University
- Paul James Crepeau, Adjunct Professor of Engineering**  
B.S. 1957, University of Rhode Island; M.S. 1960, Ph.D. 1967, Polytechnic University
- Pamela J. Cressey, Adjunct Associate Professor of Anthropology and of American Civilization**  
B.A. 1968, University of California, Los Angeles; M.A. 1973, Ph.D. 1978, University of Iowa
- Milton Orlo Critchfield, Adjunct Professor of Engineering**  
B.S. 1963, M.S. 1965, Pennsylvania State University; Ph.D. 1971, University of Illinois
- Theodore Oscar Cron, Associate Professorial Lecturer in Journalism**  
B.A. 1952, M.A.T. 1954, Harvard University
- Beth Blevins Cuje, Adjunct Associate Professor of Counseling**  
B.S. 1957, Georgetown University; M.A. in Ed. 1977, Ed.D. 1984, George Washington University
- Michael Charles Cullingford, Associate Professorial Lecturer in Engineering**  
B.Sc. 1961, University of Durham, England; M.Sc. 1966, King's College, England; Ph.D. 1975, North Carolina State University
- Willie P. Cupples, Associate Professor of Speech and Hearing**  
B.A. 1971, Baylor University; M.A. 1972, Western Illinois University; Ph.D. 1978, Northwestern University
- Timothy J. Curry, Professorial Lecturer in Finance**  
B.S. 1966, King's College (Pennsylvania); M.A. 1968, Pennsylvania State University; Ph.D. 1979, George Washington University
- Andrew David Cutler, Assistant Professor of Engineering and Applied Science**  
B.Sc. 1979, Imperial College of Science and Technology, England; M.S. 1980, Ph.D. 1987, Stanford University
- Michael Francis D'Antonio, Assistant Professorial Lecturer in Engineering**  
B.S.(E.E.) 1985, M.S. 1987, George Washington University
- William V. D'Antonio, Adjunct Professor of Sociology**  
B.A. 1948, Yale University; M.A. 1953, University of Wisconsin; Ph.D. 1958, Michigan State University
- John Severy Davies, Jr., Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1966, New Mexico State University; M.S. in E.E. 1969, Ph.D. 1979, Iowa State University



**Herbert John Davis, Professor of Business Administration**

B.S. 1965, Villanova University; M.B.A. 1968, East Carolina University; Ph.D. 1974, Louisiana State University

**Pramote Dechaumphai, Associate Professorial Lecturer in Engineering**

B.S. 1974, Khon Kaen University, Thailand; M.S. 1977, Youngstown State University; Ph.D. 1982, Old Dominion University

**Christopher James Deering, Associate Professor of Political Science; Associate Dean of Columbian College and Graduate School of Arts and Sciences**

B.A. 1974, University of Southern California; M.A. 1975, Ph.D. 1979, University of California, Santa Barbara

**Galen Frederick De Graff, Visiting Assistant Professor of Business Administration**

B.S. 1973, M.B.A. 1976, University of Virginia; Ph.D. 1991, George Washington University

**David D. DeGrazia, Assistant Professor of Philosophy and of Health Care Sciences**

B.A. 1983, University of Chicago; M.St. 1987, Oxford University; Ph.D. 1989, Georgetown University

**Cynthia H. Deitch, Adjunct Assistant Professor of Women's Studies and of Sociology**

B.A. 1969, Columbia University; M.A. 1977, Ph.D. 1980, University of Massachusetts

**Edward Della Torre, Professor of Engineering and Applied Science**

B.E.E. 1954, Polytechnic University; M.S. 1956, Princeton University; M.S. 1961, Rutgers University; D.Eng.Sc. 1964, Columbia University

**Franklin Dellon, Professorial Lecturer in Engineering**

B.E.E. 1960, City University of New York, City College; M.S.E.E. 1963, Columbia University; Ph.D. 1968, New York University

**Lisa Ann Delpy, Assistant Professor of Exercise Science**

B.S. 1985, California Polytechnic State University; M.S. 1988, George Mason University; Ph.D. 1991, University of New Mexico

**Basile Dendrou, Adjunct Professor of Engineering**

Diploma 1972, Federal Polytechnic Institute of Lausanne, Switzerland; M.S. 1974, Ph.D. 1977, Purdue University

**Frank Landt Dennis, Professorial Lecturer in Journalism**

B.A. 1929, University of Oklahoma; LL.B. 1935, Harvard University

**Michael J. Dennis, Assistant Professorial Lecturer in Art**

B.A. 1980, American University; M.F.A. 1983, George Washington University

**Linda Grant DePauw, Professor of American History**

B.A. 1961, Swarthmore College; Ph.D. 1964, Johns Hopkins University

**Dennis Martin Devaney, Professorial Lecturer in Strategic Management and Public Policy**

B.A. 1968, M.A. 1970, University of Maryland; J.D. 1975, Georgetown University

**Donald Wilson Dew, Research Professor of Counseling**

B.S. 1964, University of Baltimore; M.S. 1970, Medical College of Virginia of Virginia Commonwealth University; Ed.D. 1976, American University

**Kalvir S. Dhuga, Assistant Professor of Physics**

B.Sc. 1970, Ph.D. 1980, University of Birmingham, England

**Robert Dillon, Professorial Lecturer in Engineering**

B.A. 1949, University of Washington; M.A. in Arch. 1952, University of Florida

**Alfred Ludwig Dinsenbacher, Assistant Professorial Lecturer in Engineering**

B.C.E. 1960, City University of New York, City College; M.S. 1962, Massachusetts Institute of Technology

**Salvatore Frank Divita, Professor of Marketing**

B.I.E. 1953, New York University; M.B.A. 1956, Ohio State University; D.B.A. 1968, Harvard University

**John K. Donaldson, Jr., Assistant Professor of English as a Foreign Language**

B.A. 1956, University of Rochester, M.A. 1957, Middlebury College; M.S. 1980, Georgetown University; M.Phil. 1988, George Washington University

**Robert Paul Donaldson, Professor of Biology**

B.A. 1964, University of Texas; M.S. 1966, Miami University; Ph.D. 1971, Michigan State University

**John Donelson III, Professorial Lecturer in Engineering**

B.A. 1963, Yale University; Ph.D. 1971, Stanford University

**Richard G. Donnelly, Associate Professor of Management Science**

B.S.E. 1967, University of Michigan; Ph.D. 1972, Massachusetts Institute of Technology

- Stephen Charles Dopkins, Assistant Professor of Psychology**  
B.A. 1974, Oberlin College; M.A. 1983, Ph.D. 1988, Columbia University
- Miriam Violet Wein Dow, Assistant Professor of English**  
B.A. 1959, University of Akron; M.A. 1960, University of Michigan; Ph.D. 1977, University of Maryland
- Burkhard Drees, Assistant Professor of Economics**  
Dipl. 1983, University of Augsburg, Germany; Ph.D. 1989, University of Minnesota
- Paul Brooks Duff, Assistant Professor of Religion**  
B.A. 1974, M.A. 1979, University of Miami; Ph.D. 1988, University of Chicago
- Charles Earl Dunham, Professorial Lecturer in Engineering**  
B.S. 1963, Rochester Institute of Technology; M.S. in E.E. 1966, Ph.D. 1972, Syracuse University
- Charlotte Mary Dunham, Assistant Professorial Lecturer in Music**  
B.A. 1944, Carleton College; M.Mus. 1982, George Washington University
- Robert Martin Dunn, Jr., Professor of Economics**  
B.A. 1960, Williams College; M.A. 1963, Ph.D. 1967, Stanford University
- Douglas Leon Dwyer, Professorial Lecturer in Engineering**  
B.S. 1964, M.S. 1967, Ph.D. 1975, Virginia Polytechnic Institute and State University
- Brian M. Dwyer, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1982, Georgetown University; M.B.A. 1979, Golden Gate University
- Robert Frederick Dyer, Professor of Business Administration; Associate Dean of the School of Business and Public Management, for Graduate Business Programs**  
B.S. in B.A. 1965, M.B.A. 1966, Bowling Green State University; D.B.A. 1972, University of Maryland
- Maurice Alden East, Professor of International Affairs and Political Science; Dean of the Elliott School of International Affairs**  
B.A. 1963, Colgate University; M.A. 1966, Ph.D. 1969, Princeton University
- Russell Eaton III, Professorial Lecturer in Physics**  
B.A. 1962, M.A. 1964, Miami University; Ph.D. 1974, George Washington University
- John A. Echave, Associate Professorial Lecturer in Journalism**  
B.A. 1970, Indiana State University
- Ellen W. Echeverria, Assistant Professor of English as a Foreign Language**  
B.A. 1963, Fairleigh Dickinson University; M.A. 1969, Middlebury College
- Ralph Peter Eckerlin, Professorial Lecturer in Biological Sciences**  
B.A. 1960, Rutgers University; M.S. 1962, University of Miami; Ph.D. 1975, University of Connecticut
- Burton I. Edelson, Research Professor of Engineering and Applied Science**  
B.S. 1947, U.S. Naval Academy; M.S. 1954, Ph.D. 1960, Yale University
- Paul Francis Edgar, Adjunct Instructor in Percussion**  
B.Mus.Ed. 1971, University of Miami; M.M. 1974, Catholic University of America
- David Lee Edgell, Adjunct Professor of Travel and Tourism**  
B.S. 1961, University of Kansas; B.A. 1968, American University; M.A. 1970, Indiana University; Ph.D. 1976, University of Cincinnati
- Donald Ray Edmonds, Professorial Lecturer in Engineering**  
B.S. in M.E., B.A. 1960, Rutgers University; M.S. 1966, Ph.D. 1973, Ohio State University
- Phillip N. Edmondson, Assistant Professor of English as a Foreign Language**  
B.A. 1969, George Washington University; M.Ed. 1972, Rutgers University; M.A. 1988, Georgetown University
- Lucy E. Edwards, Assistant Professorial Lecturer in Geology**  
B.A. 1972, University of Oregon; Ph.D. 1977, University of California, Riverside
- John Eftis, Professor of Engineering and Applied Science and Adjunct Professor of Applied Mathematics**  
B.C.E. 1952, City University of New York, City College; M.S. in C.E. 1958, Columbia University; D.Sc. 1967, George Washington University
- Mary Lou Egan, Assistant Professor of International Business**  
B.A. 1973, American University; M.B.A. 1981, Ph.D. 1987, George Washington University
- Robert J. Eisen, Assistant Professor of Religion**  
B.A. 1963, Yale University; Ph.D. 1992, Brandeis University
- Marvin F. Eisenberg, Professor of Engineering and Applied Science**  
B.S. in E.E. 1953, University of Miami; M.S. in Engr. 1954, Ph.D. 1961, University of Florida; P.E.
- Ahmed Mohamed El-Assal, Visiting Assistant Professor of Engineering and Applied Science**  
D.Sc. 1988, George Washington University



- Charles Arthur Eldridge, Associate Professorial Lecturer in Engineering  
B.A. 1971, Pomona College; Ph.D. 1976, Yale University
- Rodney Walter Eldridge, Professor of International Finance  
B.A. 1949, M.A. 1959, University of Vermont; Ph.D. 1966, Columbia University
- Charles Fox Elliott, Associate Professor of Political Science and International Affairs  
B.A. 1953, Ph.D. 1964, Harvard University; M.A. 1958, University of California, Berkeley
- Donald W. Ellison, Associate Professorial Lecturer in Engineering  
B.S. 1948, Tri-State College; M.P.A. 1951, Cornell University
- Ernest Julius Englander, Associate Professor of Business Administration  
B.A. 1974, M.S. 1979, M.B.A. 1982, Ph.D. 1984, University of Washington
- Kie-Bum Eom, Associate Professor of Engineering and Applied Science  
B.S.E.E. 1976, Sogang University, Korea; M.S.E.E. 1978, Korea Advanced Institute of Science; M.S.E. 1983, University of Texas; Ph.D. 1986, Purdue University
- Joseph Epstein, Associate Professorial Lecturer in Engineering  
B.Ch.E. 1953, Polytechnic University
- Wayne Douglas Erickson, Professorial Lecturer in Engineering  
B.S. 1954, M.S. 1955, Michigan State University; M.S. 1958, D.Sc. 1962, Massachusetts Institute of Technology
- Henry Lawrence Eskew, Professorial Lecturer in Engineering  
B.S. 1959, M.S. 1963, Georgia Institute of Technology; M.A. 1967, Ph.D. 1988, American University
- Donald Michael Esterling, Professor of Engineering  
B.S. 1964, University of Notre Dame; M.A. 1966, Ph.D. 1968, Brandeis University
- Amitai Etzioni, University Professor  
B.A. 1954, M.A. 1956, Hebrew University; Ph.D. 1958, University of California, Berkeley
- Grace Elizabeth Orvis Evans, Professorial Lecturer in Art  
B.A. 1943, M.A. 1946, University of Minnesota
- Gordon C. Everstine, Professorial Lecturer in Engineering  
B.S. 1964, Lehigh University; M.S. 1966, Purdue University; Ph.D. 1971, Brown University
- James Edward Falk, Professor of Operations Research  
B.E.E. 1960, University of Detroit; M.S. 1961, Ph.D. 1965, University of Michigan
- Fereidoun Farassat, Professorial Lecturer in Engineering  
B.E. 1967, American University of Beirut; M.S. 1970, Ph.D. 1973, Cornell University
- Scott M. Fearing, Adjunct Instructor in French Horn  
B.Mus. 1979, M.Mus. 1982, North Texas State University
- Harvey B. Feigenbaum, Associate Professor of Political Science  
B.A. 1971, University of Virginia; M.A. 1974, C.Phil. 1977, Ph.D. 1981, University of California, Los Angeles
- Bernice Feinstein, Assistant Professorial Lecturer in Music  
B.A. 1947, Smith College; M.A. 1958, Ed.D. 1972, Columbia University
- James Elmer Feir, Professor of Civil Engineering  
B.S. 1950, University of Alberta, Canada; M.S. 1955, University of London; Ph.D. 1966, Cambridge University
- Carin Bea Feldman, Clinical Instructor in Speech and Hearing  
B.A. 1972, Adelphi University; M.S. 1975, City University of New York, Brooklyn College
- Elizabeth Brown Feldman, Assistant Professorial Lecturer in Journalism  
B.A. 1980, Rutgers University; M.S.J. 1982, Northwestern University
- Michael Bliss Feldman, Professor of Engineering and Applied Science  
B.S.E. 1966, Princeton University; M.S.E. 1970, Ph.D. 1973, University of Pennsylvania
- Shaw Feng, Assistant Professorial Lecturer in Engineering  
B.S. 1979, National Taiwan University; M.S. 1984, Ph.D. 1987, University of Wisconsin
- Bo Fernhall, Associate Professor of Exercise Science  
B.S. 1979, M.S. 1981, Southern Connecticut State College; Ph.D. 1984, Arizona State University
- Rolando A. Fernandez, Assistant Professorial Lecturer in Statistics  
B.S. 1970, San Augustin University, Peru; B.S. 1979, M.S. 1972, University of the District of Columbia; M.S. 1988, George Mason University
- Maddalena F. Ferretti, Adjunct Associate Professor of Italian  
B.A. 1947, Lyceum Giulio Cesare, Italy; Ph.D. 1954, University of Rome; Ph.D. 1982, American University
- Anthony Vincent Fiacco, Professor of Operations Research and Applied Science  
B.A. 1950, Union College, New York; Ph.D. 1967, Northwestern University

- Wilbur Bryan Fichter, Associate Professorial Lecturer in Engineering**  
B.S. 1957, Wake Forest College; M.S. 1966, Virginia Polytechnic Institute and State University;  
Ph.D. 1969, North Carolina State University
- Sima Ficks, Associate Professorial Lecturer in Slavic Languages**  
Diploma 1964, Kiev State University
- Nicolae Filipescu, Professor of Chemistry**  
Ph.D. 1957, University of Industrial Chemistry, Polytechnical Institute, Rumania; Ph.D. 1964, M.D.  
1975, George Washington University
- Mary Baker Findley, Adjunct Instructor in Violin**  
B.M. 1965, M.M. 1966, D.M.A. 1974, University of Cincinnati
- Robert Michael Finn, Professorial Lecturer in Engineering and in Telecommunication**  
B.S. 1959, Le Moyne College; Ph.D. 1969, Syracuse University
- Martha Finnemore, Assistant Professor of International Affairs and of Political Science**  
B.A. 1982, Harvard University; M.A. 1984, University of Sydney, Australia; M.A. 1988, Ph.D.  
1991, Stanford University
- Elizabeth Ann Fisher, Associate Professor of Classics**  
B.A. 1966, Northwestern University; M.A. 1971, Ph.D. 1972, Harvard University
- Kenneth S. Flamm, Adjunct Professor of Economics and International Affairs**  
B.A. 1973, Stanford University; Ph.D. 1979, Massachusetts Institute of Technology
- Larry Allen Fletcher, Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1959, Colorado State University; M.S. 1961, Massachusetts Institute of Technology
- Corey Flintoff, Associate Professorial Lecturer in Communication**  
B.A. 1970, University of California, Berkeley; M.A. 1971, University of Chicago
- John Raymond Fogarty, Associate Professorial Lecturer in Journalism**  
B.S. 1966, University of Baltimore
- G. Thomas Foggin, Professorial Lecturer in Geography**  
B.A. 1960, University of Virginia; M.A. 1969, University of California, Los Angeles; Ph.D. 1980,  
University of Montana
- Jean Folkerts, Associate Professor of Journalism**  
B.A. 1967, M.S. 1973, Kansas State University; Ph.D. 1981, University of Kansas
- Vincy Fon, Assistant Professor of Economics**  
B.A. 1971, Wisconsin State University; M.A. 1975, M.A. 1977, Ph.D. 1981, University of Kansas
- Ernest Harvey Forman, Professor of Management Science**  
B.S. 1964, University of Rochester; M.S. 1969, Johns Hopkins University; D.Sc. 1975, George  
Washington University
- David F. Fowler, Oliver T. Carr Professor; Professor of Accountancy; Dean of the School of Business and Public Management**  
B.S./B.A. 1955, University of Missouri
- Thomas B. Fowler, Associate Professorial Lecturer in Engineering**  
B.A. 1969, B.S. 1972, University of Maryland; M.S. 1973, Columbia University; D.Sc. 1986, George  
Washington University
- John Davidson Frame, Professor of Management Science**  
B.A. 1967, College of Wooster; M.A. 1969, Ph.D. 1976, American University
- Leslie C. Francis, Associate Professorial Lecturer in Political Communication**  
B.A. 1965, San Jose State University
- Michael J. Francis, Assistant Professorial Lecturer in Art**  
B.F.A. 1973, The Maryland Institute, College of Art; M.F.A. 1978, George Washington University
- Calvin Charles Frantz, Associate Professorial Lecturer in Engineering**  
B.S. 1959, University of Illinois; B.S. 1969, Naval Postgraduate School; M.S. 1980, George  
Washington University
- Douglas C. Frechtling, Visiting Associate Professor of Travel and Tourism**  
B.A. 1965, Hamilton College; M.Phil. 1970, Ph.D. 1973, George Washington University
- Roderick Stuart French, Professor of Philosophy; Vice President for Academic Affairs**  
B.A. 1954, Kenyon College; M.Div. 1957, Episcopal Divinity School; S.T.M. 1965, Union  
Theological Seminary; Ph.D. 1971, George Washington University
- John Andrew Frey, Professor of Romance Languages**  
B.A. 1951, M.A. 1952, University of Cincinnati; Ph.D. 1957, Catholic University of America
- Gideon Frieder, A. James Clark Professor of Engineering and Applied Science; Professor of Statistics; Dean of the School of Engineering and Applied Science**  
B.Sc. 1959, M.Sc. 1961, D.Sc. 1967, Technion, Israel



**Arthur Daniel Friedman, Professor of Engineering and Applied Science**  
B.A. 1961, B.S. in E.E. 1962, M.S. in E.E. 1963, Ph.D. 1965, Columbia University

**Melvin Harvey Friedman, Professorial Lecturer in Engineering**  
B.S. 1962, M.S. 1964, Ph.D. 1969, Carnegie-Mellon University; M.S. 1981, M.S. 1983, Johns Hopkins University

**Benno Price Fritz, Adjunct Assistant Professor of Music**  
B.A. 1985, Michigan State University; M.A. 1992, George Mason University; Dipl.F.A. 1992, University of Calgary

**Molly Frost, Assistant Professorial Lecturer in Chinese**  
B.A. 1966, Wellesley College; M.S. 1970, Ph.D. 1982, Georgetown University

**Yuen-Sun Fu, Associate Professorial Lecturer in Engineering**  
B.S. 1955, Taipei Institute of Technology, Taiwan; M.S. 1959, Kansas State University; Ph.D. 1975, University of Kansas

**Gretel A. Furner, Associate Professorial Lecturer in German**  
M.A. 1974, Oxford University; Ph.D. 1984, Universität des Saarlandes, Germany

**Jesse Warren Fussell, Associate Professorial Lecturer in Engineering**  
B.S. 1964, Louisiana State University; M.S. 1972, D.Sc. 1981, George Washington University

**Michael Graham Gallagher, Professor of Accountancy**  
B.A. in Govt. 1960, J.D. 1964, LL.M. 1971, George Washington University; C.P.A. 1965, State of Virginia

**Cayo Elizabeth Gamber, Adjunct Assistant Professor of English**  
B.A. 1979, College of William and Mary; M.Phil. 1986, Ph.D. 1991, George Washington University

**Jody Marcela Ganiban, Assistant Professor of Psychology**  
B.S. 1986, Brown University; M.A. 1989, Ph.D. 1991, University of Rochester

**Donald J. Gantzer, Associate Professorial Lecturer in Engineering**  
B.S. 1964, M.S. 1965, Ohio State University; M.A. 1979, Virginia Polytechnic Institute and State University

**Robert Norton Ganz, Jr., Professor of English**  
B.A. 1949, M.A. 1951, Ph.D. 1959, Harvard University

**Jorge Garcia, Assistant Professor of Human Services**  
B.S. 1977, Universidad Catolica de Chile; M.S. 1984, Dr.Rehab. 1988, Southern Illinois University at Carbondale

**Oscar Nicolas Garcia, Professor of Engineering and Applied Science**  
B.S. 1961, M.S. 1964, North Carolina State University; Ph.D. 1969, University of Maryland

**Nathan Conant Garner, Associate Professor of Theatre**  
B.A. 1963, Tufts University; M.A. 1966, University of North Carolina; Ph.D. 1986, University of Michigan

**Kevin George Garrahan, Assistant Professorial Lecturer in Engineering**  
B.S. 1977, University of Massachusetts; M.S. 1982, George Washington University

**Lloyd Bernard Garrett, Associate Professorial Lecturer in Engineering**  
B.S. 1962, M.S. 1968, Virginia Polytechnic Institute and State University; Ph.D. 1971, North Carolina State University

**Charles Alexander Garris, Professor of Engineering**  
B.E. 1965, State University of New York, Maritime College; M.S. 1968, Ph.D. 1971, State University of New York at Stony Brook

**Marilyn Mangold Garst, Adjunct Associate Professor of Music**  
Mus.B. 1962, University of Southern California; Mus.M. 1964, Indiana University; Ph.D. 1972, Michigan State University

**Joseph Lewis Gastwirth, Professor of Statistics and Economics**  
B.S. 1958, Yale University; M.A. 1960, Princeton University; Ph.D. 1963, Columbia University

**Harry Irving Gates, Associate Professor of Sculpture**  
B.F.A. 1958, M.F.A. 1960, University of Illinois

**Rosina M. Georgiadis, Assistant Professor of Chemistry;**  
B.S. 1982, Indiana University; Ph.D. 1988, University of California, Berkeley

**Carl H. Gerhold, Associate Professorial Lecturer in Engineering**  
B.S.M.E. 1970, Ohio Northern University; M.S.M.E. 1972, Ph.D. 1974, Purdue University

**Fariborz Ghadar, Professor of International Business**  
B.S.(C.E.) 1968, B.S. 1969, M.S.(M.E.) 1970, Massachusetts Institute of Technology; M.B.A. 1972, D.B.A. 1975, Harvard University

**Ahmad Ghamarian, Associate Professorial Lecturer in Engineering**  
B.S. 1972, Arya-Mehr University of Technology, Iran; M.S. 1977, D.Sc. 1981, George Washington University

**Ali Ghovalou, Professorial Lecturer in Physics**  
M.S. 1966, University of Mainz, Germany; Ph.D. 1971, George Washington University

**Phyllis Eleanor Gieseler, Adjunct Instructor in Voice**

- Howard Frank Gillette, Jr., Professor of American Civilization**  
B.A. 1964, Ph.D. 1970, Yale University
- Charles Matthew Gilmore, Professor of Engineering and Applied Science**  
B.S. 1963, M.S. 1964, Pennsylvania State University; Ph.D. 1971, University of Maryland; P.E.
- Irving Isadore Glick, Professor of Mathematics**  
B.A. 1953, Johns Hopkins University; Ph.D. 1961, University of Maryland
- Jacqueline J. Glover, Assistant Professor of Philosophy**  
B.A. 1977, University of North Carolina, Wilmington; Ph.D. 1988, Georgetown University
- Michael Stanley Gluck, Professorial Lecturer in Engineering**  
B.S. 1961, City University of New York, City College; M.S. 1963, New York University; D.Sc. 1978, George Washington University
- Peter A. Gnoffo, Assistant Professorial Lecturer in Engineering**  
B.S. 1974, Polytechnic University; M.S. 1977, George Washington University; M.A. 1980, Ph.D. 1983, Princeton University
- Desa Gobovic, Visiting Assistant Professor of Engineering and Applied Science**  
B.Sc. 1976, University of Titograd, Yugoslavia; M.S. 1985, D.Sc. 1988, George Washington University
- Sidney Gold, Adjunct Instructor in English**  
B.A. 1971, M.A. 1977, State University of New York College at Brockport
- Robert Stanley Goldfarb, Professor of Economics**  
B.A. 1964, Columbia University; M.A. 1965, M.Phil. 1967, Ph.D. 1968, Yale University
- Robert Goulard, Professor of Engineering and Applied Science**  
Ph.D. 1957, Purdue University
- Lois Graff, Associate Professor of Management Science; Associate Dean of the School of Business and Public Management, for Undergraduate Programs**  
B.A. 1964, Mundelein College; M.S. 1965, Ph.D. 1969, New York University; M.B.A. 1979, University of Illinois
- Ulf Ake Wilhelm Grahn, Associate Professorial Lecturer in Music**  
M.M. 1973, Catholic University of America
- Mary J. Granger, Assistant Professor of Management Science**  
B.S. 1965, Mount Saint Vincent College; M.B.A. 1980, Ph.D. 1990, University of Cincinnati
- Jennifer M. Green, Assistant Professor of English**  
M.A. 1984, University of Edinburgh, Scotland; M.A. 1986, Ph.D. 1990, University of Pennsylvania
- Arnold Greenland, Professorial Lecturer in Engineering**  
B.S. 1969, Case Western Reserve University; M.A. 1973, Ph.D. 1975, University of Rochester
- David Alan Grier, Assistant Professor of Statistics; Director of the University Honors Program**  
B.A. 1978, Middlebury College; M.S. 1983, Ph.D. 1986, University of Washington
- Edward Geary Griffin, Professorial Lecturer in History and International Affairs**  
B.A. 1950, Yale University; M.A. 1951, Ph.D. 1965, Columbia University
- Michael D. Griffin, Professorial Lecturer in Engineering**  
B.A. 1971, Johns Hopkins University; M.S. 1979, University of Southern California; Ph.D. 1977, University of Maryland
- Fuller Griffith, Assistant Professor of Graphics**  
B.S. 1952, University of Wisconsin; M.F.A. 1969, George Washington University
- William Byron Griffith, Professor of Philosophy**  
B.A. 1958, University of Notre Dame; M.A. 1962, Ph.D. 1963, Yale University
- Catherine Griggs, Lecturer in Anthropology**  
B.A. 1986, M.A. 1989, George Washington University
- Roy Richard Grinker, Assistant Professor of Anthropology**  
B.A. 1983, Grinnell College; M.A. 1985, Ph.D. 1989, Harvard University
- Donald Gross, Professor of Operations Research; Associate Vice President for Research and Graduate Studies**  
B.S. 1956, Carnegie-Mellon University; M.S. 1959, Ph.D. 1962, Cornell University; P.E.
- Phillip Donald Grub, Aryamehr Professor of Multinational Management**  
B.A., B.A. in Ed. 1953, Eastern Washington State College; M.B.A. 1960, D.B.A. 1964, George Washington University
- Marina Keet Grut, Lecturer in Dance**
- Donald Urban Gubser, Professorial Lecturer in Engineering**  
B.S. 1963, M.S. 1964, Ph.D. 1969, University of Illinois



**Carl F. Gudenius, Assistant Professor of Theatre**

B.A. 1980, Providence College; M.F.A. 1983, Wayne State University

**Eileen Morris Guenther, Adjunct Instructor in Organ**

B.A., Mus.B. 1970, University of Kansas; M.A., D.M.A. 1973, Catholic University of America

**Roy James Guenther, Professor of Music**

B.Mus.Ed. 1966, Mus.B. 1968, University of Kansas; M.A. 1974, Ph.D. 1979, Catholic University of America

**Murli Manohar Gupta, Professor of Mathematics**

B.S. 1963, M.S. 1965, Agra University, India; M.S. 1969, Ph.D. 1971, University of Saskatchewan, Canada

**Helmut Haberzettl, Associate Professor of Physics**

M.Sc. 1975, Ph.D. 1979, University of Bonn, Germany

**Robert Arthur Hadley, Associate Professor of History**

B.A. 1959, Bowdoin College; M.A. 1960, Ph.D. 1964, University of Pennsylvania

**James K. Hahn, Assistant Professor of Engineering and Applied Science**

B.S. 1979, University of South Carolina; M.S. 1981, University of California, Los Angeles; M.S. 1983, Ph.D. 1989, Ohio State University

**William Emmitt Halal, Professor of Management Science**

B.S. 1956, Purdue University; M.B.A. 1970, Ph.D. 1971, University of California, Berkeley

**John Frederick Halldane, Professorial Lecturer in Engineering**

B.S. 1959, B.Arch. 1961, University of New Zealand, Ph.D. 1968, University of Auckland, New Zealand

**Morton Halperin, Edgar R. Baker Professor of International Affairs**

B.A. 1958, Columbia College; M.A. 1959, Ph.D. 1961, Yale University

**Janet J. Hampton, Visiting Associate Professor of Spanish**

B.A. 1958, University of Kansas; M.A. 1966, Mexico City College, Ph.D. 1985, Catholic University of America

**William R. Hancuff, Jr., Professorial Lecturer in Engineering**

B.S. 1966, Loyola University of Louisiana; M.S. 1968, Stanford University; Ph.D. 1972, University of Texas

**William C. Handorf, Professor of Finance**

B.A. 1966, M.B.A. 1967, University of Michigan; Ph.D. 1973, Michigan State University

**Michael Joseph Hanley, Assistant Professorial Lecturer in Engineering**

B.S. 1958, U.S. Naval Academy; M.S. 1971, Naval Postgraduate School

**Barry Wellesley Hannah, Adjunct Professor of Engineering**

B.S. 1963, M.S. 1965, Ph.D. 1973, University of Cincinnati

**Lawrence N. Hansen, Research Professor of Communication**

B.A. 1963, University of Illinois

**Muhammad Ikramul Haque, Associate Professor of Engineering and Applied Science**

B.Sc. 1961, Punjab University, Pakistan; B.Sc. 1965, Engineering University, Pakistan; M.S. 1970, Ph.D. 1973, Colorado State University

**Jay Charles Hardin, Professorial Lecturer in Engineering**

B.S. 1964, M.S. 1965, Ph.D. 1969, Purdue University

**John Hardt, Adjunct Professor of Economics**

B.A. 1945, M.A. 1948, University of Washington; M.A. 1950, Ph.D. 1955, Columbia University

**Valentina Harizanov, Assistant Professor of Mathematics**

B.S. 1978, M.S. 1980, University of Belgrade, Yugoslavia; M.A. 1984, Ph.D. 1987, University of Wisconsin

**Edmund Patrick Harper, Associate Professor of Physics**

B.S. 1965, University College, Dublin; M.S. 1969, Ph.D. 1972, Purdue University

**Robert Joseph Harrington, Professor of Engineering and Applied Science**

B.S. 1962, Ph.D. 1965, University of Liverpool, England

**Robert Scott Harrison, Adjunct Instructor in Exercise Science and Tourism Studies****Joan Francis Harrop, Associate Professorial Lecturer in Art**

B.S. 1947, Mount Mary College; M.F.A. 1976, M.A. 1983, George Washington University

**Deborah Mary Hart, Assistant Professor of Geography and Regional Science**

B.A. 1981, B.A. 1983, M.A. 1984, University of Witwatersrand, South Africa; Ph.D. 1990, Syracuse University

**Kim Jay Hartswick, Associate Professor of Art**

B.A. 1973, Allegheny College; M.A. 1976, Case Western Reserve University; M.A. 1981, Ph.D. 1984, Bryn Mawr College

**Lin C. Hartung, Assistant Professorial Lecturer in Engineering**

B.S. 1985, M.E. 1985, Rensselaer Polytechnic Institute

- Jerry Harvey, Professor of Management Science**  
B.B.A. 1957, Ph.D. 1963, University of Texas
- Lisa St. Clair Harvey, Assistant Professor of Communication**  
B.A. 1979, McGill University, Canada; M.S. 1983, Cornell University; Ph.D. 1990, University of Washington
- Muriel Hasbun, Assistant Professorial Lecturer in Art**  
B.A. 1983, Georgetown University; M.F.A. 1989, George Washington University
- Salah S. Hassan, Assistant Professor of Business Administration**  
B.S. 1975, King Saud University, Saudi Arabia; M.S. 1977, Oklahoma State University; Ph.D. 1984, Ohio State University
- Charles R. Hauer, Professorial Lecturer in Engineering**  
B.Ch.E. 1951, M.S.Ch.E. 1959, Pratt Institute
- Diane Gatsis Havinga, Adjunct Assistant Professor of Communication**  
B.S. 1976, Illinois State University; M.A. 1977, Michigan State University
- Oli Havrylyshyn, Professor of Economics and International Affairs**  
B.A. 1966, Queen's University, Canada; Ph.D. 1972, Massachusetts Institute of Technology
- Donald Hawkins, Professor of Tourism Studies and Research Professor of Medicine**  
B.A. 1958, King's College, Pennsylvania; M.A. 1960, Lehigh University; Ed.D. 1967, New York University
- Janet Craig Heddeshimer, Professor of Counseling and Research Professor of Psychiatry and Behavioral Sciences; Associate Dean of the School of Education and Human Development**  
B.A. 1965, Coe College; M.A. 1968, Ph.D. 1971, Ohio State University
- Hermann Josef Helgert, Professor of Engineering and Applied Science**  
B.S. 1962, M.S. 1964, Ph.D. 1966, State University of New York at Buffalo
- Rachelle Silverman Heller, Associate Professor of Engineering and Applied Science**  
B.S. 1964, State University of New York at Stony Brook; M.S. 1972, Ph.D. 1986, University of Maryland
- Jeffrey Roger Henig, Professor of Political Science**  
B.A. 1973, Cornell University; Ph.D. 1977, Northwestern University
- Charles Joseph Herber, Associate Professor of European History**  
B.A. 1952, Dickinson College; M.A. 1957, Ph.D. 1965, University of California, Berkeley
- Robert Alexander Herring, Jr., Professorial Lecturer in Engineering**  
B.S. 1938, M.S. 1938, Georgetown University
- Lynn Ann Hertel, Adjunct Instructor in Flute**  
B.Mus. 1986, George Washington University
- Susan Hertz, Professorial Lecturer in Anthropology**  
B.A. 1968, Stanford University; M.A. 1969, Ph.D. 1974, University of Minnesota
- John G. Hibbits, Adjunct Professor of International Affairs**  
B.S. 1962, Fordham University; M.A. 1972, Georgetown University
- George E. Hicho, Assistant Professorial Lecturer in Engineering**  
B.S. 1960, University of Pittsburgh; M.S. 1977, George Washington University
- Joan L. Hilderbrandt, Instructor in Chemistry**  
B.S. 1963, Pennsylvania State University
- Peter Proal Hill, Professor of History and International Affairs**  
B.A. 1949, Tufts University; M.A. 1954, Boston University; Ph.D. 1966, George Washington University
- James William Hillis, Professor of Speech and Hearing**  
B.S. 1952, University of Nebraska; M.A. 1957, University of Maryland; Ph.D. 1963, Ohio State University
- Joseph Hilmy, Professor of Accountancy**  
B.Com. 1947, M.S. 1954, Ph.D. 1959, University of Aberdeen, Scotland
- Steven Campbell Hilmy, Assistant Professorial Lecturer in Music**  
B.A. 1984, George Washington University; M.M. 1991, Johns Hopkins University
- Alfred John Hildebeitel, Professor of Religion**  
B.A. 1963, Haverford College; M.A. 1966, Ph.D. 1973, University of Chicago
- Denis Michael Hitchcock, Associate Professor of Art**  
B.A. 1967, University of California, Los Angeles; M.F.A. 1970, Ph.D. 1977, Princeton University
- Alfred Hren Hoare, Professor of Human Services**  
B.S. 1962, Carlow College; M.S. 1964, University of North Carolina; Ed.D. 1980, George Washington University



- Herman Hedberg Hobbs, Professor of Physics**  
B.S. 1953, M.S. 1955, George Washington University; Ph.D. 1958, University of Virginia
- Kevin G. Hockett, Assistant Professor of Mathematics**  
B.S. 1979, Illinois State University; Ph.D. 1986, Cornell University
- Lance Joel Hoffman, Professor of Engineering and Applied Science**  
B.S. 1964, Carnegie-Mellon University; M.S. 1967, Ph.D. 1970, Stanford University
- Richard Frank Hoglund, Professorial Lecturer in Engineering**  
B.S. 1954, M.S. 1955, Ph.D. 1960, Northwestern University
- R. Michael Holland, Assistant Professorial Lecturer in Engineering**  
B.S. 1974, Florida Institute of Technology; M.A. 1982, Central Michigan University
- Mary Alida Holman, Professor of Economics**  
B.A. 1955, M.A. 1957, Ph.D. 1963, George Washington University
- Robert William Holmstrom, Associate Professor of Psychology**  
B.A. 1956, Trinity College, Connecticut; Ph.D. 1965, Duke University
- James O. Horton, Professor of American History and Civilization**  
B.A. 1964, State University of New York at Buffalo; M.A. 1970, University of Hawaii; Ph.D. 1973, Brandeis University
- Alexander Hoshovsky, Professorial Lecturer in Engineering**  
B.A. 1952, Saint Mary's University of San Antonio; M.A. 1963, George Washington University; Ph.D. 1973, American University
- John Chang-Cheng Hsing, Associate Professorial Lecturer in Engineering**  
B.S.E.E. 1967, National Taiwan University; M.S.E.E. 1970, Ph.D. 1974, University of Massachusetts
- Terry Lee Hufford, Professor of Botany**  
B.S. 1961, M.A. 1962, Bowling Green State University; Ph.D. 1972, Ohio State University
- Marcel B. Humber, Visiting Assistant Professor of Finance**  
B.S. 1951, Wake Forest College; M.B.A. 1978, Ph.D. 1990, George Washington University
- Robert Lee Humphrey, Jr., Professor of Anthropology**  
B.A. 1962, American University; Ph.D. 1970, University of New Mexico
- Hing-Loi A. Hung, Adjunct Professor of Engineering**  
B.S. 1968, Massachusetts Institute of Technology; M.S. 1970, Ph.D. 1974, Cornell University
- Catherine Hurley, Assistant Professor of Statistics**  
B.Sc. 1982, University College, Ireland; M.S. 1984, Ph.D. 1987, University of Washington
- Timothy Ray Husson, Assistant Professorial Lecturer in Engineering**  
B.E.(E.E.) 1976, Manhattan College
- Gérard Paul Huvé, Assistant Professor of French**  
B.A. 1963, American University; M.A. 1969, University of Maryland
- Clare L. Iacobelli, Assistant Professor of English as a Foreign Language**  
B.A. 1973, Wayne State University; M.A. 1976, University of Michigan; M.S. 1980, Georgetown University
- Robert Nicholas Ianacone, Professor of Special Education; Associate Dean of the School of Education and Human Development**  
B.S. 1968, M.S. 1971, State University of New York at Buffalo; Ed.D. 1976, University of Florida
- Mohammed Ashraf Imam, Adjunct Associate Professor of Engineering**  
B.S. 1965, Regional Institute of Technology, Ranchi University, India; M.S. 1972, Carnegie-Mellon University; D.Sc. 1978, George Washington University
- John Frederic Ince, Professorial Lecturer in Engineering**  
B.S. 1966, Webb Institute of Naval Architecture; M.S. 1968, Massachusetts Institute of Technology; M.S. 1972, D.Sc. 1978, George Washington University
- Charles Gabriel Interrante, Professorial Lecturer in Engineering**  
B.S. 1959, M.S. 1962, Ph.D. 1963, Lehigh University
- Telba Zalkind Irony, Assistant Professor of Operations Research**  
B.S. 1980, M.S. 1984, University of Sao Paulo, Brazil; M.S. 1987, Ph.D. 1990, University of California, Berkeley
- Geryes Moussa Jabbour, Assistant Professor of Finance**  
License 1973, 1979, Lebanese University, Lebanon; M.B.A. 1983, George Washington University
- William D. Jackson, Adjunct Professor of Engineering**  
B.Sc. 1947, Ph.D. 1960, Glasgow University, Scotland; A.R.C.S.T. 1948, University of Strathclyde, Scotland
- Leslie Bravman Jacobson, Associate Professor of Theatre**  
B.S. 1970, Northwestern University; M.F.A. 1974, Boston University
- Virginia E. Jahelka, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.S. 1983, Virginia Polytechnic Institute and State University; M.A. 1989, George Washington University

- Raymond Lee Jarvis, *Adjunct Instructor in Exercise Science and Tourism Studies*  
 Mary L. Jasnoski, *Assistant Professor of Psychology*  
 B.A. 1977, M.A. 1980, Ph.D. 1983, University of Kansas  
 Lisa Yen Chang Jiordano, *Lecturer in Chinese*  
 B.A. 1970, University of Chinese Culture, Taiwan  
 Diana Entwisle Johnson, *Associate Professor of Biology and of Genetics*  
 B.A. 1970, Cornell College; Ph.D. 1975, University of Chicago  
 Martin R. Johnson, *Assistant Professor of Chemistry*  
 B.A. 1982, Reed College; Ph.D. 1989, University of Texas  
 Nancy Diers Johnson, *Associate Professor of Dance*  
 B.S. 1955, University of Minnesota; M.A. 1966, University of Iowa; Ed.D. 1980, University of North Carolina at Greensboro  
 Stuart E. Johnson, *Associate Professorial Lecturer in International Affairs and Political Science*  
 B.A. 1966, Amherst College; Ph.D. 1971, Massachusetts Institute of Technology  
 William Reid Johnson, *Associate Professor of History and International Affairs*  
 B.A. 1951, Oberlin College; M.A. 1955, Ph.D. 1961, University of Washington  
 Douglas Linwood Jones, *Professor of Engineering*  
 B.M.E. 1963, M.S.E. 1965, D.Sc. 1970, George Washington University; P.E.  
 Kay Howard Jones, *Professorial Lecturer in Engineering*  
 B.S. 1956, University of Washington, M.S. 1961, Ph.D. 1968, University of California, Berkeley  
 Rembert Fred Jones, Jr., *Associate Professorial Lecturer in Engineering*  
 B.S. 1958, University of Maryland, M.C.E. 1964, Ph.D. 1973, Catholic University of America  
 Jeffrey H. Joseph, *Professorial Lecturer in Business Administration*  
 B.A. 1966, George Washington University, J.D. 1973, University of Baltimore; M.A. 1974, University of Pennsylvania  
 Sumit Joshi, *Assistant Professor of Economics*  
 B.A. 1984, Delhi University, India; M.A. 1986, Delhi School of Economics, India; Ph.D. 1991, Indiana University  
 Suresh M. Joshi, *Associate Professorial Lecturer in Engineering*  
 B.S. 1967, Banaras Hindu University, India; M.Tech. 1969, Indian Institute of Technology; Ph.D. 1973, Rensselaer Polytechnic Institute  
 Eva Scheyer Jospe, *Associate Professorial Lecturer in Religion*  
 M.A. 1983, Georgetown University  
 Frederick L. Joutz, *Assistant Professor of Economics*  
 B.A. 1979, University of Maryland; M.A. 1982, University of British Columbia, Canada; Ph.D. 1987, University of Washington  
 Christopher Clayton Joyner, *Professor of Political Science*  
 B.A. 1970, M.A. 1972, M.A. 1973, Florida State University; Ph.D. 1977, University of Virginia  
 Jer-Nan Juang, *Professorial Lecturer in Engineering*  
 B.S. 1969, Cheng Kung University, Taiwan, M.S. 1971, Tennessee Technological University; Ph.D. 1974, Virginia Polytechnic Institute and State University  
 Hugo Dietrich Junghenn, *Professor of Mathematics*  
 B.S. 1964, Albright College; M.A. 1967, Villanova University, Ph.D. 1971, George Washington University  
 Robert Konrad Kahn, *Professorial Lecturer in Psychology*  
 B.A. 1946, University of Pennsylvania, M.A. 1953, George Washington University; Ph.D. 1957, Pennsylvania State University  
 Walter Kurt Kahn, *Professor of Engineering and Applied Science*  
 B.E.E. 1951, Cooper Union, M.E.E. 1954, D.E.E. 1960, Polytechnic University  
 Apostolos Konstantinos Kakaes, *Assistant Professor of Engineering and Applied Science*  
 B.S. 1976, M.S. 1977, University of Colorado; Ph.D. 1987, Polytechnic University  
 Daniel R. Kane, *Assistant Professor of Business Administration*  
 B.S. 1953, George Washington University; B.S.F.S. 1954, J.D. 1956, LL.M. 1964, Georgetown University  
 Stephen Arnold Karp, *Professor of Psychology*  
 B.A. 1949, City University of New York, Brooklyn College; M.A. 1952, New School for Social Research; Ph.D. 1962, New York University  
 Irving Jack Katz, *Professor of Mathematics*  
 B.S. 1956, City University of New York, Brooklyn College; M.A. 1958, Ohio State University; Ph.D. 1964, University of Maryland



- Judith G. Kauffman, Associate Professorial Lecturer in Art**  
B.F.A. 1968, Cornell University; M.F.A. 1981, Antioch University
- Roger Emanuel Kaufman, Professor of Engineering**  
B.S. 1962, Tufts University; M.F.A. 1965, Yale University; M.E. 1968, Ph.D. 1969, Rensselaer Polytechnic Institute; P.E.
- Azer Kehnemui, Professorial Lecturer in Engineering**  
B.S. 1962, Robert College, Turkey; M.S. 1963, University of Illinois; D.Sc. 1975, George Washington University
- Steven Keller, Assistant Professor of Communication**  
B.S. 1968, M.A. 1969, Ohio State University
- Eugene Walter Kelly, Jr., Professor of Counseling and Human Services**  
B.A. 1958, M.Div. 1962, Josephinum College; M.Ed. 1969, Ph.D. 1971, University of South Carolina
- Thomas William Kelly, Adjunct Professor of Engineering**  
B.S. 1956, Temple University
- Robert Emmet Kennedy, Jr., Professor of European History**  
B.A. 1963, Johns Hopkins University; M.A. 1965, Boston College; Ph.D. 1973, Brandeis University
- Norayr Krikor Khatcheressian, Associate Professor of Physics; Associate Dean of Columbian College and Graduate School of Arts and Sciences**  
B.A. 1960, M.A. 1963, George Washington University; Ph.D. 1966, University of Virginia
- Ram K. Khatri, Professorial Lecturer in Engineering**  
B.S. 1952, Agra University, India; B.E. 1956, Sagar University; M.S. 1961, Lehigh University; Ph.D. 1971, University of Maryland
- Dina Rizk Khoury, Assistant Professor of History**  
B.A. 1977, University of California, Riverside; M.A. 1980, Ph.D. 1987, Georgetown University
- Khalilollah Khozeimeh, Associate Professorial Lecturer in Engineering**  
B.C.E. 1965, M.S. 1967, D.Sc. 1974, George Washington University
- Edward U. Kiehl, Adjunct Instructor in Trombone**  
B.M.E. 1961, Wichita State University
- Gershon Kieval, Associate Professorial Lecturer in International Affairs and Political Science**  
B.A. 1975, Harvard University; M.A. 1977, Ph.D. 1980, Johns Hopkins University
- Sura Kang Kim, Adjunct Assistant Professor of Music**  
B.A. 1949, Ewha Woman's University, Korea; Mus.B. 1950, Baldwin-Wallace College; Mus.M. 1952, Manhattan School of Music
- Young C. Kim, Professor of Political Science and International Affairs**  
M.A. 1958, Vanderbilt University; Ph.D. 1958, University of Pennsylvania
- Young-Key Kim-Renaud, Associate Professor of Korean Language and Culture**  
B.A. 1963, Ewha Woman's University, Korea; M.A. 1965, University of California, Berkeley; Ph.D. 1974, University of Hawaii
- Taeko Kimura, Instructor in Japanese**  
B.A. 1965, Kumamoto Women's University, Japan
- Michael King, Professor of Chemistry**  
B.S. 1966, Illinois Institute of Technology; M.A. 1967, Ph.D. 1970, Harvard University
- Sheila Nataraj Kirby, Professorial Lecturer in Economics**  
B.A. 1965, Loreto Convent College, India; M.A. 1970, University of Michigan; M.Phil. 1980, Ph.D. 1983, George Washington University
- Nancy J. Kirkendall, Professorial Lecturer in Statistics**  
B.S. 1965, M.S. 1967, Ohio State University; Ph.D. 1974, George Washington University
- Margaret R. Kirkland, Assistant Professor of English as a Foreign Language**  
B.A. 1969, Mary Baldwin College; M.A. 1977, Georgetown University
- Arthur David Kirsch, Professor of Statistics and of Psychology**  
B.A. 1955, George Washington University; M.S. 1956, Ph.D. 1957, Purdue University
- Zeev Kitov, Associate Research Professor of Engineering and Applied Science**  
M.S. 1959, Ph.D. 1968, Moscow Institute of Communication Engineers, Russia
- Arjo Klamer, Associate Professor of Economics**  
Ph.D. 1981, Duke University
- Peter Flindell Klarén, Professor of History and International Affairs**  
B.A. 1960, Dartmouth College; M.A. 1964, Ph.D. 1968, University of California, Los Angeles
- Vladislav Klein, Professor of Engineering**  
Mech Engr. 1954, Technical University, Czechoslovakia; Ph.D. 1974, Cranfield Institute of Technology, England

- Mark S. Klock, Associate Professor of Finance**  
B.A. 1978, Pennsylvania State University; Ph.D. 1983, Boston College; J.D. 1988, University of Maryland
- Charles Eugene Knadler, Jr., Associate Professorial Lecturer in Engineering**  
B.E.S. 1965, Johns Hopkins University; M.S. 1983, D.Sc. 1989, George Washington University
- Joseph Alexander Knight, Professorial Lecturer in Engineering**  
B.S.(E.E.) 1963, Virginia Polytechnic Institute and State University; M.S.(E.E.) 1965, Ph.D. 1968, Georgia Institute of Technology
- Robert Earle Knowlton, Associate Professor of Biology**  
B.A. 1960, Bowdoin College; Ph.D. 1970, University of North Carolina
- Stephen Jeffery Koch, Assistant Professorial Lecturer in Engineering**  
B.S. 1967, Memphis State University
- Tzvetan Krumov Konstantinov, Adjunct Assistant Professor of Piano**  
M.Mus. 1974, Bulgarian State Conservatoire
- Can Edip Korman, Assistant Professor of Engineering and Applied Science**  
B.S. 1985, M.S. 1987, Ph.D. 1990, University of Maryland
- Joseph Daniel Kotulski, Assistant Professorial Lecturer in Engineering**  
B.S. 1975, M.S. 1977, University of Illinois at Chicago Circle
- Gerald Joseph Kowalski, Adjunct Professor of Engineering**  
B.S. 1968, Marshall University; M.S. 1970, University of Arkansas, D.Sc. 1983, George Washington University
- Bruce Michael Kramer, Professor of Engineering and Applied Science**  
B.S./M.S. 1972, Ph.D. 1979, Massachusetts Institute of Technology
- Jessica Anne Krash, Adjunct Instructor in Piano**  
B.A. 1982, Harvard University; M.M. 1984, The Juilliard School
- Joseph Henry Kravitz, Associate Professorial Lecturer in Geology**  
B.S. 1957, Syracuse University; M.S. 1975, M.Phil. 1977, Ph.D. 1983, George Washington University
- Ruth Marilyn Krulfeld, Professor of Anthropology**  
B.A. 1956, Brandeis University; Ph.D. 1974, Yale University
- John F. Kuehls, Associate Professorial Lecturer in Engineering**  
B.S. 1982, M.S. 1983, University of Akron; Ph.D. 1988, University of Akron
- Joel Corneal Kuipers, Associate Professor of Anthropology**  
B.A. 1976, Calvin College; M.Phil. 1978, Ph.D. 1982, Yale University
- Joseph H. Kullback, Professorial Lecturer in Statistics**  
B.A. 1955, George Washington University, M.S. 1957, Ph.D. 1961, Stanford University
- Walter Kulyk, Assistant Professorial Lecturer in Engineering**  
B.S.C.E. 1970, M.S.C.E. 1971, University of Akron
- Krishna R. Kumar, Assistant Professor of Accountancy**  
B.S. 1974, Indian Institute of Technology; M.B.A. Indian Institute of Management, India; Ph.D. Columbia University
- Naomi Hayashi Kuo, Lecturer in Japanese**  
B.A. 1953, Shinna Women's College, Japan
- Tamami Kusuda, Professorial Lecturer in Engineering**  
B.S. 1947, Tokyo University, Japan; Ph.D. 1955, University of Minnesota
- John E. Kwoka, Jr., Professor of Economics**  
B.A. 1967, Brown University; Ph.D. 1971, University of Pennsylvania
- Nicholas Kyriakopoulos, Professor of Engineering**  
B.E.E. 1960, M.S. in Engr 1963, D.Sc. 1968, George Washington University
- John Marion Lachin III, Professor of Statistics; Director of the Biostatistics Center**  
B.S. 1965, Tulane University of Louisiana; Sc.D. 1972, University of Pittsburgh
- Melvin Paul Lader, Professor of Art**  
B.A. 1969, M.A. 1973, State University of New York at Albany; Ph.D. 1981, University of Delaware
- William Norman LaForge, Associate Professorial Lecturer in Business Administration**  
B.A. 1972, Delta State University; J.D. 1975, University of Mississippi; LL.M. 1982, Georgetown University
- Jerry Lee Lake, Professor of Photography**  
B.F.A. 1966, Virginia Commonwealth University; M.F.A. 1968, Ohio University
- Peter S. Lam, Professorial Lecturer in Engineering**  
B.S. 1967, Oregon State University; M.S. 1968, Ph.D. 1971, Stanford University



- Paul A. Lamb, Associate Professorial Lecturer in Engineering**  
B.S. (E.E.) 1960, University of Arizona; M.B.A. 1973, University of California, Los Angeles; D.Sc. 1982, George Washington University
- Kuang-Kuo Gordon Lan, Professor of Statistics**  
B.S. 1966, M.S. 1968, Taiwan University; M.A. 1971, Ph.D. 1974, Columbia University
- Roger Henry Lang, Professor of Engineering and Applied Science**  
B.S.E.E. 1962, M.S.E.E. 1964, Ph.D. 1968, Polytechnic University
- Phyllis Ann Langton, Professor of Sociology**  
B.A. 1961, M.A. 1962, California State University, Los Angeles; Ph.D. 1968, University of California, Los Angeles
- William Stone Lassiter, Associate Professorial Lecturer in Engineering**  
B.S. 1961, Ph.D. 1971, North Carolina State University; M.S. 1968, M.B.A. 1973, College of William and Mary
- Debra J. Latourette, Assistant Professor of Communication**  
B.A. 1980, Ph.D. 1990, Northwestern University; M.A. 1983, University of Michigan
- Lawrence Bell Laurent, Professorial Lecturer in Journalism**
- Geza Peter Lauter, Professor of International Business**  
B.A. 1954, Institute for Foreign Languages, Hungary; B.A. 1962, M.B.A. 1964, Ph.D. 1968, University of California, Los Angeles
- George Robert Lawrence, Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1964, Widener College; M.S. 1973, Engr. 1978, George Washington University
- Robert Edward Lawrence, Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1968, M.S. 1969, Ph.D. 1972, Rensselaer Polytechnic Institute
- Edward Pitt Lawson, Assistant Professorial Lecturer in Art**  
B.A. 1951, Bowdoin College; M.A. 1955, New York University
- An Thanh Le, Professorial Lecturer in Engineering**  
B.S.(E.E.) 1976, M.S. 1978, George Washington University
- Wendy Leigh Lebolt, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.S. 1983, College of William and Mary; M.A. 1986, George Washington University; Ph.D. 1990, Medical College of Virginia of Virginia Commonwealth University
- James H. Lebovic, Associate Professor of Political Science**  
B.A. 1973, California State University, Long Beach; M.A. 1975, Ph.D. 1981, University of Southern California
- Ann-Myongsook Lee, Adjunct Assistant Professor of Music (Voice)**  
B.A. 1956, Seoul National University College of Music; Mus.M. 1959, Artist's Diploma 1960, New England Conservatory of Music
- Davis Lin-Chuan Lee, Associate Professor of Chinese**  
B.S. 1955, Chung-Hsing University, Taiwan; M.S. 1959, University of Minnesota; Ph.D. 1979, Georgetown University
- James Der-Yi Lee, Professor of Engineering and Applied Science**  
B.S. 1964, National Taiwan University; M.S. 1967, Rice University; Ph.D. 1971, Princeton University
- Myrna Pike Lee, Associate Professor of Mathematics**  
B.A. 1957, Cornell University; M.S. 1959, Ph.D. 1962, University of Illinois
- Robert Lee, Assistant Professorial Lecturer in Engineering**  
B.S. 1972, George Washington University
- Ting N. Lee, Professor of Engineering and Applied Science**  
B.S.E.E. 1962, Cheng Kung University, Taiwan; M.S.E.E. 1965, Illinois Institute of Technology; Ph.D. 1972, University of Wisconsin
- Donald Richard Lehman, Professor of Physics**  
B.A. 1962, Rutgers University; M.S. 1964, Air Force Institute of Technology; Ph.D. 1970, George Washington University
- Lawrence Martin Leibowitz, Professorial Lecturer in Engineering**  
B.S. 1960, M.S. 1964, New York University; D.Sc. 1978, George Washington University
- Eugene Barry Leiderman, Associate Professorial Lecturer in Engineering**  
B.A. 1965, M.L.S. 1967, University of Maryland; M.S. 1970, Ohio State University
- Stephen B. Leighton, Associate Professorial Lecturer in Engineering**  
B.S. 1968, Yale University; M.S. 1969, D.Sc. 1976, Massachusetts Institute of Technology
- Patricia Hilary Madoo Lengermann, Professor of Sociology**  
B.A. 1963, Oxford University; M.A. 1966, Ph.D. 1969, Cornell University
- D. Jeffrey Lenn, Associate Professor of Business Administration**  
B.S. 1962, University of Pennsylvania, M.Div. 1966, Andover Newton Theological School; M.S. 1969, Yale University; Ph.D. 1981, Boston College

- Richard M. Lenoir, Assistant Professor of Strategic Management**  
B.B.A. 1971, Texas A&M University; M.B.A. 1973, University of Texas; D.B.A. 1987, University of Colorado
- David R. Levin, Professorial Lecturer in Engineering**  
B.A. 1934, M.A. 1935, Ph.D. 1937, University of Wisconsin
- James Daniel Levy, Adjunct Assistant Professor of Music**  
B.Mus. 1983, George Washington University
- John Frederick Lewis, Professor of Geology**  
B.S. 1959, M.S. 1960, Victoria University, New Zealand; D.Phil. 1964, Oxford University
- Martin W. Lewis, Assistant Professor of Geography and Regional Science**  
B.A. 1979, University of California, Santa Cruz; M.A. 1975, Ph.D. 1987, University of California, Berkeley
- William H. Lewis, Professor of Political Science and International Affairs**  
B.A. 1951, M.A. 1953, George Washington University; Ph.D. 1960, American University
- Harold Liebowitz, L. Stanley Crane Professor of Engineering and Applied Science**  
B.Ae.E. 1944, M.Ae.E. 1946, D.Ae.E. 1948, Polytechnic Institute of New York; P.E.
- Jay Liebowitz, Professor of Management Science**  
B.B.A. 1979, M.B.A. 1980, D.Sc. 1985, George Washington University
- Marilyn Louise Liebreiz-Himes, Associate Professor of Business Administration**  
B.A. 1966, Wheaton College; M.A. 1973, Ph.D. 1980, Michigan State University
- Hubert Whitman Lilliefors, Professor of Statistics**  
B.A. 1952, Ph.D. 1964, George Washington University; M.A. 1953, Michigan State University
- Carl Arne Linden, Professor of Political Science and International Affairs**  
B.A. 1951, Syracuse University; M.A. 1956, Harvard University; Ph.D. 1966, George Washington University
- Roy Charles Lindholm, Professor of Geology**  
B.S. 1959, University of Michigan; M.A. 1963, University of Texas; Ph.D. 1967, Johns Hopkins University
- Craig William Linebaugh, Professor of Speech and Hearing and Research Professor of Medicine**  
B.A. 1970, Lebanon Valley College; M.A. 1974, Ph.D. 1975, Temple University
- Donald C. Linkowski, Professor of Counseling and Research Professor of Psychiatry and Behavioral Sciences**  
B.A. 1961, M.S. 1963, Ph.D. 1969, State University of New York at Buffalo
- Joel Arthur Lipkin, Associate Professorial Lecturer in Engineering**  
B.A. 1974, George Washington University; M.A. 1977, Ph.D. 1979, Catholic University of America
- Lewis Lipnick, Adjunct Instructor in Bassoon**  
Mus.B. 1968, Peabody Institute of Baltimore
- Diana Leigh Lipscomb, Associate Professor of Biology**  
B.A. 1976, Agnes Scott College; Ph.D. 1982, University of Maryland
- Steven L. Livingston, Assistant Professor of Political Communication**  
B.A. 1981, University of South Florida; M.A. 1984, Ph.D. 1990, University of Washington
- John Lobuts, Jr., Professor of Management Science**  
B.S. 1957, Fairmont State College; M.A. in Ed. 1965, Ed.D. 1970, George Washington University
- Murray Howard Loew, Professor of Engineering and Applied Science**  
B.S.E.E. 1965, Drexel University; M.S.E.E. 1967, Ph.D. 1972, Purdue University; P.E.
- John Mortimer Logsdon, Professor of Political Science and International Affairs**  
B.S. 1960, Xavier University, Ohio; Ph.D. 1970, New York University
- Ming-Jean Cheng Loh, Associate Professorial Lecturer in Chinese**  
B.A. 1959, M.A. 1962, National Taiwan University; M.A. 1967, Yale University
- Rainald Löhner, Associate Research Professor of Engineering and Applied Science**  
M.Sc. 1982, Technical University of Brunswick, Germany; Ph.D. 1984, University College of Swansea, Wales
- Richard W. Longstreth, Associate Professor of American Civilization**  
B.A. 1968, University of Pennsylvania; Ph.D. 1977, University of California, Berkeley
- Gerald Dean Love, Professorial Lecturer in Engineering**  
B.S. in C.E. 1949, M.S. in C.E. 1956, Iowa State University; D.Eng. 1975, Rensselaer Polytechnic Institute
- John Carl Lowe, Professor of Geography and Regional Science**  
B.A. 1958, M.A. 1960, George Washington University; Ph.D. 1969, Clark University



- James Michael Luckring, Assistant Professorial Lecturer in Engineering**  
B.S. 1973, M.S. 1974, Purdue University; Ph.D. 1985, North Carolina State University
- Gregory Ludlow, Associate Professor of French**  
Licence de Lettres 1962, University of Paris; Ph.D. 1970, McGill University, Canada
- Ronald Laurence Luntz, Adjunct Instructor in Exercise Science and Tourism Studies**
- Gordon Edward Lyon, Associate Professorial Lecturer in Engineering**  
B.S. 1964, Michigan Technological University; M.S. 1966, M.S. 1967, Ph.D. 1972, University of Michigan
- Richard Charles Macon, Professorial Lecturer in Engineering**  
B.S.E.E. 1969, University of South Alabama; M.S.E. 1971, Ph.D. 1973, Southern Methodist University
- James Hunt Maddox, Professor of English**  
B.A. 1965, Princeton University; M.A. 1967, Ph.D. 1969, Yale University
- Lynda Marie Maddox, Associate Professor of Business Administration**  
B.A. 1972, M.A. 1974, Pennsylvania State University; Ph.D. 1978, Southern Illinois University
- Khalid Mahmood, Professor of Engineering**  
B.A. 1950, B.S. 1953, Panjab University, Pakistan; M.S. 1964, University of Washington; Ph.D. 1971, Colorado State University
- Hosam M. Mahmoud, Associate Professor of Statistics**  
B.S. 1976, B.S. 1979, Cairo University, Egypt; M.S. 1981, Ph.D. 1983, Ohio State University
- Eileen Marie Mahoney, Associate Professor of Communication**  
B.A. 1980, University of California, San Diego; Ph.D. 1987, Temple University
- Peter N. Majumdar, Associate Professorial Lecturer in Engineering**  
B.S. 1971, Indian Institute of Technology, Kharagpur; M.S. 1973, University of Michigan; Ph.D. 1983, Catholic University of America
- Donald Malec, Assistant Professorial Lecturer in Statistics**  
B.S. 1975, Southern Illinois University; Ph.D. 1982, State University of New York at Buffalo
- Arun S. Malik, Associate Professor of Economics**  
B.A. 1978, Johns Hopkins University; Ph.D. 1984, Bowdoin College
- Mary J. Mallott, Assistant Professor of Business and Public Policy**  
B.S. 1976, Manchester College; M.S. 1980, Ph.D. 1992, University of Pittsburgh
- Paul Bernard Malone III, Associate Professor of Management Science**  
B.S. 1952, U.S. Military Academy; M.S. in Per.Ad. 1969, D.B.A. 1973, George Washington University
- Forrest Maltzman, Assistant Professor of Political Science**  
B.A. 1986, Wesleyan University; Ph.D. 1992, University of Minnesota
- Doris Louise Mandel, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1982, Connecticut College
- Arthur Frank Manfredi, Jr., Professorial Lecturer in Engineering**  
B.S. 1965, Cooper Union; M.S. 1968, Polytechnic University; D.Sc. 1975, George Washington University
- Jarol B. Manheim, Professor of Political Communications and of Political Science; Director of the National Center for Communication Studies**  
B.A. 1968, Rice University; M.A. 1969, Ph.D. 1971, Northwestern University
- Edward Marasciulo, Professorial Lecturer in Geography and Regional Science**  
B.A. 1950, University of Miami
- Elissa Marder, Assistant Professor of French**  
B.A. 1981, Cornell University; Ph.D. 1989, Yale University
- F. Landis Markley, Professorial Lecturer in Engineering**  
B.Eng. 1962, Cornell University; Ph.D. 1967, University of California, Berkeley
- William Henry Marlow, Professor of Operations Research**  
B.S. 1947, St. Ambrose College; M.S. 1948, Ph.D. 1951, University of Iowa
- David Walter Marsh, Adjunct Instructor in Bass**
- Carol Dianne Martin, Associate Professor of Engineering and Applied Science**  
B.A. 1965, Western Maryland College; M.S. 1971, University of Maryland; Ed.D. 1987, George Washington University
- Terrence Joseph Martin, Instructor in Counseling**  
B.A. in Ed. 1976, M.A. in Ed.&H.D. 1981, George Washington University
- Charles Jefferson Marvray II, Adjunct Instructor in Percussion**

- Carole Maso, Jenny McKean Moore** *Writer in Washington*  
B.A. 1977, Vassar College
- Shelley Ellen Smith Mastran, Associate Professorial Lecturer in Geography and Regional Science**  
B.A. 1965, Vassar College; M.A. 1974, George Washington University
- Anthony James Mastro, Professor of Accountancy**  
B.S. 1951, M.B.A. 1953, New York University; M.A. 1963, University of Notre Dame; C.P.A. 1955, State of New Jersey
- Peter Matic, Assistant Professorial Lecturer in Engineering**  
B.S. 1977, Illinois Institute of Technology; Ph.D. 1983, Lehigh University
- Candace Matthews, Assistant Professor of English as a Foreign Language**  
B.A. 1972, DePauw University; M.S. 1978, Indiana University
- Ward Douglas Maurer, Professor of Engineering and Applied Science**  
B.S. 1958, University of Chicago; M.A. 1962, Ph.D. 1965, University of California, Berkeley
- Catherine Mavriplis, Assistant Professor of Engineering and Applied Science**  
B.Eng. 1983, McGill University, Canada; S.M. 1986, Ph.D. 1989, Massachusetts Institute of Technology
- Leonard C. Maximon, Research Professor of Physics**  
B.A. 1947, Oberlin College; Ph.D. 1952, Cornell University
- Paul D. Maycock, Professorial Lecturer in Engineering**  
B.S. 1957, M.S. 1962, Iowa State University
- Omar Mazzoni, Adjunct Associate Professor of Engineering**  
B.S. 1961, National University of Litoral, Argentina; M.S. 1971, Polytechnic University
- Thomas Andrew Mazzuchi, Associate Professor of Operations Research and of Engineering Management**  
B.A. 1978, Gettysburg College; M.S. 1979, D.Sc. 1982, George Washington University
- David Willard McAleavey, Professor of English; Associate Dean of Columbian College and Graduate School of Arts and Sciences, for Student Services**  
B.A. 1968, M.F.A. 1972, Ph.D. 1975, Cornell University
- Edward McCafferty, Professorial Lecturer in Engineering**  
B.S. 1950, Wilkes College; M.S. 1964, Ph.D. 1968, Lehigh University
- Cynthia McClintock, Professor of Political Science**  
B.A. 1967, Harvard University; M.A. 1968, University of California, Los Angeles; Ph.D. 1976, Massachusetts Institute of Technology
- Michelle Carter McElvaney, Assistant Professorial Lecturer in Engineering**  
B.A. 1977, Loyola College (Maryland); M.A. 1980, University of Maryland
- Patrick W. McGann, Instructor in English**  
B.A. 1980, M.A. 1985, Texas Tech University; Ph.D. 1992, University of Illinois
- Dorn Charles McGrath, Jr., Professor of Geography and Regional Science and of Urban and Regional Planning**  
B.A. 1952, Dartmouth College; M.C.P. 1959, Harvard University
- Michael Francis McGrath, Professorial Lecturer in Engineering**  
B.S. 1970, M.S. 1972, Catholic University of America; D.Sc. 1986, George Washington University
- Marlene C. McGuirl, Associate Professorial Lecturer in Environmental Studies**  
B.A. 1959, Indiana University; J.D. 1963, DePaul University; M.A. 1965, Rosary College; LL.M. 1978, George Washington University
- Graham Wilson McIntyre, Adjunct Professor of Engineering**  
B.S. 1953, U.S. Military Academy; M.S. 1966, University of Southern California
- James M. McMichael, Professorial Lecturer in Engineering**  
B.S. 1965, M.S. 1966, University of Maryland; Ph.D. 1971, University of Colorado
- Chester Barton McMullen III, Adjunct Assistant Professor of English**  
B.A. 1970, M.A. 1974, University of South Florida; Ph.D. 1992, University of Colorado
- Gerald Robert McNichols, Professorial Lecturer in Engineering**  
B.S. 1965, Case Western Reserve University; M.S. 1966, University of Pennsylvania; D.Sc. 1976, George Washington University
- Asha K. Mehrotra, Professorial Lecturer in Engineering**  
B.S. 1961, University of Calcutta, India; M.S. 1965, University of Roorkee, India; M.S. 1968, Nova Scotia Technical College, Canada; Ph.D. 1982, Polytechnic University
- Subhash C. Mehrotra, Associate Professorial Lecturer in Engineering**  
B.Tech. 1959, Indian Institute of Technology, Kharagpur, India; M.S. 1967, University of Iowa; Ph.D. 1973, University of California
- James Patrick Melendez, Instructor in Naval Science**  
B.S. 1986, College of the Holy Cross



**Christine Foster Meloni, Associate Professor of English as a Foreign Language**

B.A. 1963, Wells College; M.A. 1964, Middlebury College; D.Lettere 1975, University of Rome; M.S. 1981, American University; Ed.D. 1987, George Washington University

**Arnold Charles Meltzer, Professor of Engineering and Applied Science**

B.S. in Engr. 1958, M.S. in Engr. 1961, D.Sc. 1967, George Washington University

**Gary Stephen Meltzer, Assistant Professor of Classics and of Humanities**

B.A. 1973, M.A. 1981, M.Phil. 1984, Ph.D. 1987, Yale University

**Constantine C. Menges, Research Professor of International Affairs**

B.A. 1960, Columbia College; Ph.D. 1968, Columbia University

**Henry Merchant, Associate Professor of Biology**

B.S. 1964, M.S. 1966, University of Maryland; Ph.D. 1970, Rutgers University

**Bernard Matthew Mergen, Professor of American Civilization**

B.A. 1959, University of Nevada; M.A. 1960, Ph.D. 1968, University of Pennsylvania

**David John Michel, Professorial Lecturer in Engineering**

B.S. 1964, University of Missouri, Rolla; M.S. 1966, Ph.D. 1968, Pennsylvania State University

**James R. Millar, Professor of International Affairs; Associate Dean of the Elliott School of International Affairs**

B.A. 1958, University of Texas; Ph.D. 1965, Cornell University

**Bennett Miller, Professorial Lecturer in Engineering**

B.A. 1959, M.A. 1961, Ph.D. 1965, Columbia University

**James Carl Miller, Professor of Psychology**

B.A. 1958, J.D. 1962, Ph.D. 1966, Yale University

**John Houston Miller, Associate Professor of Chemistry**

B.A. 1976, Oberlin College; Ph.D. 1980, University of Virginia

**Lenore Donna Miller, Associate Professorial Lecturer in Art; Director, Dimock Gallery**

B.A. 1969, Goucher College; M.F.A. 1972, George Washington University

**Lillian Miller, Professorial Lecturer in American Civilization and Art History**

B.A. 1943, Radcliffe College; M.A. 1948, Ph.D. 1962, Columbia University

**Joshua M. Mitchell, Assistant Professor of Political Science**

B.G.S. 1980, M.A. 1984, University of Michigan; M.A. 1986, Ph.D. 1989, University of Chicago

**Mohammad Reza Modarres-Hakimi, Assistant Professor of Statistics**

B.S. 1981, M.S. 1982, Ph.D. 1990, American University

**Daniel D. Moerder, Assistant Professorial Lecturer in Engineering**

B.S., M.S. 1980, Ph.D. 1984, Drexel University

**Leo Carl Moersen, Associate Professor of Accountancy and Business Law**

B.S. 1976, University of Connecticut; J.D. 1981, College of William and Mary

**Manouchehr Mohajeri, Professorial Lecturer in Engineering**

B.Sc. 1964, Tehran University, Iran; M.S. 1968, D.Sc. 1977, Massachusetts Institute of Technology

**Samuel Burdick Molina, Associate Professor of Art**

B.A. 1964, M.A. 1969, University of Wyoming

**Akbar Montaser, Professor of Chemistry**

B.S. 1969, Pahlavi University, Iran; Ph.D. 1974, Michigan State University

**Mary Elizabeth Moody, Assistant Professorial Lecturer in Speech and Hearing**

B.A. 1968, College of New Rochelle; M.A. 1970, Catholic University of America

**Sharon M. Moody, Assistant Professor of Accountancy**

B.A. 1976, McKendree College; M.B.A. 1979, Southern Illinois University; Ph.D. 1987, University of Mississippi

**Michael Owen Moore, Assistant Professor of Economics and International Affairs**

B.A. 1979, University of Texas; M.S. 1984, Ph.D. 1988, University of Wisconsin

**David Dunston Moran, Adjunct Professor of Engineering**

B.S. 1965, M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1971, University of Iowa

**Kim Moreland, Associate Professor of English**

B.A. 1976, Ohio University; M.A. 1978, State University of New York at Binghamton; Ph.D. 1984, Brown University

**Eugene A. Morelli, Assistant Professorial Lecturer in Engineering**

B.S. 1981, Bucknell University; M.S.E. 1984, Princeton University; D.Sc. 1990, George Washington University

**John Andrew Morgan, Jr., Professor of Political Science and Public Affairs**

B.A. 1957, Stetson University; M.A. 1959, Ph.D. 1963, Duke University

- Joseph David Morgan, Jr., Professorial Lecturer in Engineering**  
B.S. 1959, U.S. Air Force Academy; M.S. 1968, Ph.D. 1974, Georgia Institute of Technology
- David William Morris, Assistant Professor of Biological Sciences and of Genetics**  
B.Sc. 1972, Ph.D. 1976, University of Leeds, England
- Charles Arthur Moser, Professor of Slavic**  
B.A. 1956, Yale University; M.A. 1958, Ph.D. 1962, Columbia University
- Michael F. Moses, Assistant Professor of Mathematics**  
B.Sc. 1980, Ph.D. 1983, Monash University, Australia
- Yael Margalit Moses, Assistant Professor of Hebrew**  
B.S. 1965, Temple University; M.S. 1975, Towson State University; M.A. 1985, Baltimore Hebrew College
- Daniel Moshenberg, Associate Professor of English**  
B.S. 1976, Johns Hopkins University; M.A. 1977, M.Phil. 1979, Ph.D. 1987, Columbia University
- Faye Stollman Moskowitz, Associate Professor of English**  
B.A. 1970, M.A. 1979, George Washington University
- James Norvel Moss, Associate Professorial Lecturer in Engineering**  
B.S. 1962, Tennessee Polytechnic Institute; M.S. 1968, University of Virginia; Ph.D. 1974, Virginia Polytechnic Institute and State University
- Vivekananda Mukhopadhyay, Associate Professorial Lecturer in Engineering**  
B.Tech. 1968, Indian Institute of Technology; M.S. 1970, Sc.D. 1972, Massachusetts Institute of Technology
- Daniel R. Mulville, Professorial Lecturer in Engineering**  
B.S. in M.E. 1962, M.S. 1966, George Washington University; Ph.D. 1974, Catholic University of America
- Teresa Anne Murphy, Associate Professor of American Civilization**  
B.A. 1973, University of California, Berkeley; M.A. 1976, M.Phil. 1977, Ph.D. 1982, Yale University
- Michael Kenneth Myers, Professor of Engineering and Applied Science**  
B.A. 1962, Willamette University; B.S. 1962, M.S. 1963, Ph.D. 1966, Columbia University
- Thomas J. Nagy, Associate Professor of Expert Systems**  
B.A. 1965, St. Mary's University; M.S. 1970, Trinity University; Ph.D. 1974, University of Texas
- Yacoub Mohammad Najjar, Assistant Professor of Engineering and Applied Science**  
B.S. 1983, Yarmouk University, Jordan; M.S. 1986, Ph.D. 1990, University of Oklahoma
- Winston Napier, Visiting Assistant Professor of English**  
B.A. 1974, William Paterson College; M.A. 1978, Ph.D. 1991, Howard University
- Bhagirath Narahari, Assistant Professor of Engineering and Applied Science**  
B.E. 1982, Birla Institute of Technology and Science, India; M.S.E. 1984, Ph.D. 1987, University of Pennsylvania
- Honey Weinstein Nashman, Assistant Professor of Human Services**  
B.S. 1966, New York University; M.S. 1967, Smith College
- Seyyed Hossein Nasr, University Professor of Islamic Studies**  
B.S. 1954, Massachusetts Institute of Technology; M.A. 1956, Ph.D. 1958, Harvard University
- Henry Richard Nau, Professor of Political Science and International Affairs**  
B.S. 1963, Massachusetts Institute of Technology; M.A. 1967, Ph.D. 1972, Johns Hopkins University
- Tapan Kumar Nayak, Associate Professor of Statistics**  
B.Sc. 1976, University of Calcutta, India; M.Stat. 1979, Indian Statistical Institute; Ph.D. 1983, University of Pittsburgh
- Edgar Henry Neal, Associate Professorial Lecturer in Engineering**  
B.S.(E.E.) 1958, Pennsylvania State University; M.S. 1976, George Washington University
- Thomas J. Nelson, Assistant Professorial Lecturer in Engineering**  
B.S.E.E. 1981, Old Dominion University
- S. Edward Nevius, Professorial Lecturer in Engineering**  
B.A. 1967, University of Kansas; M.S. 1969, Kansas State University; Ph.D. 1975, Florida State University
- Christopher Ng, Professorial Lecturer in Engineering**  
B.S. 1944, Chiao-Tung University, China; M.S. 1959, University of Connecticut; Ph.D. 1973, University of Maryland
- David Lee Nicholson, Professorial Lecturer in Engineering**  
B.S.E.E. 1964, Wichita State University; M.E.E. 1966, Rensselaer Polytechnic Institute; Ph.D. 1970, State University of New York at Buffalo; M.S. in Adm. 1977, George Washington University
- Avise Stuart Nissen, Assistant Professor of English**  
B.A. 1966, Florida Presbyterian College; M.A. 1973, University of South Florida; M.S. 1975, Ph.D. 1984, University of Iowa



**Walter Robert Nunn, Professorial Lecturer in Statistics**

B.A. 1957, M.A. 1961, University of California, Berkeley; Ph.D. 1972, George Washington University

**Thomas Kevin O'Brien, Associate Professorial Lecturer in Engineering**

B.S. 1972, M.S. 1976, Ph.D. 1978, Virginia Polytechnic Institute and State University

**John Francis O'Dea, Associate Professorial Lecturer in Engineering**

B.S. 1968, Webb Institute of Naval Architecture; M.S. 1970, Ph.D. 1974, Massachusetts Institute of Technology

**Lynn R. Offermann, Associate Professor of Psychology**

B.A. 1975, State University of New York College at Oswego; M.A. 1978, Ph.D. 1981, Syracuse University

**Yuri Olkhovsky, Associate Professor of Russian**

B.A. 1956, M.A. 1957, University of Minnesota; Ph.D. 1968, Georgetown University

**Ratko Orlandic, Visiting Assistant Professor of Statistics**

B.S. 1984, Moscow Energy Institute, USSR; M.S. 1986, Ph.D. 1989, University of Virginia

**Lisa E. Osterman, Assistant Professor of Geology**

B.S. 1975, University of Dayton; M.S. 1977, University of Maine; Ph.D. 1982, University of Colorado

**Marta A. Oyhenart, Lecturer in Business Administration**

B.A. 1979, George Mason University; M.B.A. 1982, George Washington University

**Türker Ozdogan, Professor of Ceramics**

Master of Ceramics Diploma 1967, School of Applied Fine Arts, Turkey; M.F.A. 1972, George Washington University

**Randall Kent Packer, Professor of Biology**

B.S. 1967, Lock Haven State College; Ph.D. 1971, Pennsylvania State University

**Chei-Min Paik, Professor of Accountancy and Quantitative Methods**

B.A. 1957, University of Minnesota; M.B.A. 1959, University of California, Los Angeles; D.B.A. 1963, Harvard University

**Robert John Pallansch, Adjunct Instructor in Tuba****Phyllis Marynick Palmer, Associate Professor of Women's Studies and of American Civilization**

B.A. 1966, Oberlin College; M.A. 1967, Ph.D. 1973, Ohio State University

**Ronald D.F. Palmer, Diplomatic Consultant and Adjunct Professor of International Affairs**

B.A. 1954, Howard University; M.A. 1957, Johns Hopkins University

**Angela C. Pao, Assistant Professor of English and of Theatre and Dance**

B.A. 1973, Wellesley College; M.A. 1977, New York University; M.A. 1983, Smith College; Ph.D. 1989, University of California

**John Paradiso, Associate Professorial Lecturer in Art**

B.A. 1971, Manhattan College; B.F.A. 1978, M.F.A. 1982, George Washington University

**Martha Pardavi-Horvath, Professor of Engineering and Applied Science**

M.Sc. 1967, Moscow State University; Ph.D. 1985, Hungarian Academy of Sciences

**Yoon Shik Park, Professor of International Banking and Finance**

B.A. 1964, Kyung Hee University, Korea; M.B.A. 1967, Fairleigh Dickinson University; D.B.A. 1970, Harvard University; M.A. 1973, Ph.D. 1976, George Washington University

**You Keun Park, Assistant Professorial Lecturer in Engineering**

B.S. 1973, Seoul National University, Korea; M.S. 1983, George Mason University

**You-Me Park, Instructor in English**

B.A. 1982, M.A. 1984, Seoul National University

**William Carleton Parke, Associate Professor of Physics**

B.S. 1963, Ph.D. 1967, George Washington University

**Richard Parnas, Adjunct Instructor in Violin and Viola****Robert Parris, Professor of Music**

B.S. in Mus.Ed. 1945, M.S. in Mus.Ed. 1946, University of Pennsylvania; B.S. in Mus.Comp. 1948, Juilliard School of Music

**Gail Kern Paster, Professor of English**

B.A. 1966, Smith College; M.Phil. 1970, Ph.D. 1972, Yale University

**Donald Clark Paup, Professor of Exercise Science**

B.A. 1961, Occidental College; M.S. 1969, Ph.D. 1970, Tulane University

**Joseph Pelzman, Professor of Economics**

B.S. 1971, Ph.D. 1976, Boston College

**Alan Irvin Penn, Assistant Professorial Lecturer in Mathematics**

B.A. 1964, M.A. 1967, Ph.D. 1971, University of Maryland

**Thomas Paul Perazzoli, Adjunct Instructor in Flute**

**Malinee Peris, Adjunct Assistant Professor of Piano**

Licentiate 1946, 1947, Trinity College of Music, London; Licentiate 1950, Royal Academy of Music

**David T. Perry, Instructor in Naval Science**

B.S. 1986, Duke University

**James Hilliard Perry, Jr., Professor of Business Administration**

B.A. 1964, Duke University; M.A., M.B.A. 1970, Ph.D. 1974, Stanford University

**Cheryl L. Person, Assistant Professorial Lecturer in Speech and Hearing**

B.S. 1973, Miami University; M.A. 1978, University of Cincinnati

**Rolf A. Peterson, Professor of Psychology and of Psychiatry and Behavioral Sciences**

B.S. 1964, University of Wisconsin-Oshkosh; M.S. 1967, Ph.D. 1970, University of Iowa

**Robert T. Petruska, Assistant Professorial Lecturer in Finance**

B.S. 1960, Pennsylvania State University; M.Ed. 1991, George Mason University

**Joseph J. Petto, Instructor in Naval Science**

B.A. 1986, Pennsylvania State University

**J. Roger Peverley, Associate Professor of Physics**

B.A. 1960, M.A. 1964, Ph.D. 1964, Cambridge University

**Paul S. Peyser, Associate Professor of Finance**

B.A. 1966, State University of New York at Binghamton; M.A. 1970, Ph.D. 1979, University of Wisconsin

**James E. Pfaendtner, Associate Professorial Lecturer in Engineering**

B.S. 1968, Ph.D. 1974, Wayne State University; M.S. 1970, University of Michigan

**Elizabeth A. Phillips, Assistant Research Professor of Statistics**

B.A. 1970, M.A. 1978, Oxford University, England; M.Sc. 1971, University of Reading, England; Ph.D. 1992, George Washington University

**Robert F. Phillips, Associate Professor of Economics**

B.A. 1978, University of California, Berkeley; M.A. 1980, M.Phil. 1981, Ph.D. 1985, Columbia University

**Catherine Jones Pickar, Associate Professor of Music**

B.Mus. 1974, University of Kentucky; M.Mus. 1980, George Washington University

**Raymond L. Pickholtz, Professor of Engineering and Applied Science**

B.E.E. 1954, M.E.E. 1958, City University of New York, City College; Ph.D. 1966, Polytechnic University

**Neal Jay Plotkin, Professorial Lecturer in Engineering**

B.A. 1961, Columbia College; M.A. 1968, Cornell University; Ph.D. 1972, Syracuse University

**Judith Ann Abrams Plotz, Professor of English**

B.A. 1960, Radcliffe College; B.A. 1962, M.A. 1966, Cambridge University; Ph.D. 1965, Harvard University

**Francis M. Ponti, Professorial Lecturer in Statistics**

B.S. 1961, M.B.A. 1963, Drexel University

**Paul John Poppen, Associate Professor of Psychology**

B.A. 1969, Central University of Iowa; Ph.D. 1973, Cornell University

**Minnie Bruce Pratt, Assistant Professorial Lecturer in Women's Studies**

B.A. 1968, University of Alabama; Ph.D. 1979, University of North Carolina

**Marie Daly Price, Assistant Professor of Geography and Regional Science**

B.A. 1984, University of California, Berkeley; M.A. 1986, Ph.D. 1991, Syracuse University

**E. Brian Pritchard, Professorial Lecturer in Engineering**

B.S. 1957, M.S. 1959, Virginia Polytechnic Institute and State University

**Wilbur L. Pritchard, Professorial Lecturer in Engineering**

B.E.E. 1943, City University of New York, City College

**William A. Pucilowsky, Associate Professor of Theatre**

B.S. 1964, Wilkes College; M.F.A. 1972, Boston University

**Charles William Puffenbarger, Associate Professor of Journalism**

B.S. 1951, University of Maryland; M.A. 1964, George Washington University

**Jose A. Quiroga, Assistant Professor of Spanish**

B.A. 1980, Boston University; M.Phil. 1987, Ph.D. 1988, Yale University

**Jon Alrik Quitslund, Professor of English**

B.A. 1961, Reed College; Ph.D. 1967, Princeton University

**Sonya Antoinette Quitslund, Associate Professor of Religion**

B.A. 1958, Seattle University; M.A. 1964, Ph.D. 1967, Catholic University of America

**George A. Rabchevsky, Assistant Professorial Lecturer in Geology**

Ph.D. 1972, George Washington University



**Eulalia C. Rach, Assistant Professor of Tourism Studies**

B.S. 1976, University of Wisconsin Platteville; M.B.A. 1985, University of Wisconsin-Whitewater; Ed.D. 1992, George Washington University

**David Ramaker, Professor of Chemistry**

B.S. 1965, University of Wisconsin Milwaukee; M.S. 1968, Ph.D. 1971, University of Iowa

**Pradeep A. Rau, Assistant Professor of Business Administration**

B.S. 1972, Indian Institute of Technology; M.B.A. 1974, Indian Institute of Management; D.B.A. 1983, Kent State University

**Peter Reddaway, Professor of Political Science and International Affairs**

B.A. 1962, M.S. 1966, Cambridge University

**Joan Roddy Regnell, Associate Professor of Speech and Hearing**

B.A. 1954, M.A. 1960, George Washington University

**Scheherazade S. Rehman, Assistant Professor of International Finance and Business**

B.B.A. 1985, M.B.A. 1989, George Washington University

**Bernard Reich, Professor of Political Science and International Affairs**

B.A. 1961, City University of New York, City College; M.A. 1963, Ph.D. 1964, University of Virginia

**Frances Catherine Reid, Assistant Professor of English as a Foreign Language**

B.A. 1965, College of Notre Dame of Maryland; M.S. 1970, Georgetown University

**Walter Phillip Reid, Adjunct Professor of Engineering**

B.S. 1938, M.S. 1939, Carnegie-Mellon University; Ph.D. 1942, University of Pittsburgh

**Carol A. Reisen, Assistant Professorial Lecturer in Psychology**

B.A. 1970, Ph.D. 1983, George Washington University

**David Reiss, Professor of Psychiatry and Behavioral Sciences, of Medicine, and of Psychology**

B.A. 1958, M.D. 1962, Harvard University

**Leo Paul Ribuffo, Professor of History**

B.A. 1966, Rutgers University; M.Phil. 1969, Ph.D. 1978, Yale University

**Charles Edward Rice, Professor of Psychology**

B.S. 1954, Iowa State University of Science and Technology; Ph.D. 1959, Case Western Reserve University

**Max Norman Richburg, Assistant Professorial Lecturer in Business Administration**

B.S. 1967, Auburn University; J.D. 1971, University of Alabama

**Kerry Kathleen Riley, Assistant Professor of Communication**

B.A. 1978, M.A. 1981, Kent State University; Ph.D. 1991, University of Texas

**J. Carlos Rivero, Assistant Professor of Psychology**

B.A. 1984, Columbia University; M.A. 1988, Ph.D. 1991, New York University

**Philip Robbins, Professor of Journalism**

B.A. 1952, Washington and Lee University; M.S. 1955, Columbia University

**David Caron Roberts, Adjunct Professor of Engineering**

B.S. 1965, Johns Hopkins University; M.S.E. 1968, University of Pennsylvania; M.S. 1973, University of Maryland

**Steven V. Roberts, Associate Professorial Lecturer in Political Communication**

B.A. 1984, Harvard University

**Richard Mark Robin, Assistant Professor of Russian**

B.S. 1972, Georgetown University; M.A. 1974, Ph.D. 1982, University of Michigan

**E. Arthur Robinson, Jr., Associate Professor of Mathematics**

B.S. 1977, Tufts University; M.A. 1981, Ph.D. 1983, University of Maryland

**Lilien Filipovitch Robinson, Professor of Art**

B.A. 1962, M.A. 1965, George Washington University; Ph.D. 1978, Johns Hopkins University

**Fernando Robles, Associate Professor of International Marketing**

B.S. 1968, Universidad Nacional de Ingenieria, Peru; M.A. 1970, ESAN, Peru; M.B.A. 1972, Georgia State University; Ph.D. 1979, Pennsylvania State University

**Richard Rodriguez, Assistant Professorial Lecturer in Art**

B.A. 1972, University of Virginia; M.F.A. 1981, George Washington University

**Sharon J. Rogers, Adjunct Associate Professor of Sociology; Associate Vice President for Academic Affairs**

B.A. 1963, Bethel College; M.A. 1967, University of Minnesota; Ph.D. 1976, Washington State University

- Derrill Conway Rohlfis, Associate Professor of Engineering and Applied Science**  
B.E.E. 1955, M.S. in Engr. 1959, George Washington University; P.E.
- Cynthia A. Rohrbeck, Associate Professor of Psychology**  
B.A. 1980, Cornell University; M.A. 1983, Ph.D. 1986, University of Rochester
- Peter Rollberg, Assistant Professor of Slavic Languages**  
Ph.D. 1988, University of Leipzig, Germany
- Ann Romines, Associate Professor of English**  
B.A. 1964, Central Methodist College; M.A. 1968, Tufts University; Ph.D. 1977, George Washington University
- Yongwu Rong, Assistant Professor of Mathematics**  
B.S. 1983, University of Science and Technology of China; Ph.D. 1989, University of Texas, Austin
- Carolyn Rusch Rose, Adjunct Associate Professor of Art and Anthropology**  
B.A. 1971, Sweet Briar College; M.A. 1976, George Washington University
- James N. Rosenau, University Professor of International Affairs**  
B.A. 1948, Bard College; M.A. 1949, Johns Hopkins University; Ph.D. 1957, Princeton University
- William F. Rosenberger, Assistant Research Professor of Statistics**  
B.A. 1986, Towson State University; M.Phil. 1990, Ph.D. 1992, George Washington University
- Kathleen Ross-Kidder, Assistant Professorial Lecturer in Psychology**  
B.A. 1965, University of Michigan; M.A. 1978, George Mason University; Ph.D. 1990, George Washington University
- Shmuel Rotenstreich, Associate Professor of Engineering and Applied Science**  
B.S. 1974, Tel Aviv University; M.S. 1982, Ph.D. 1983, University of California, San Diego
- Lawrence Allen Rothblat, Professor of Psychology and of Anatomy**  
B.A. 1964, M.A. 1967, Ph.D. 1968, University of Connecticut
- David Alton Rowley, Professor of Chemistry; Assistant Dean of Columbian College and Graduate School of Arts and Sciences**  
B.S. 1963, M.S. 1964, State University of New York at Albany; Ph.D. 1968, University of Illinois
- Robert Warren Rycroft, Associate Professor of Political Science and International Affairs**  
B.A. 1967, M.A. 1972, Ph.D. 1976, University of Oklahoma
- Raymond Theodore Rye II, Lecturer in Geology**  
B.S. 1955, Iowa State University; M.S. 1971, George Washington University
- Bradley William Sabelli, Assistant Professor of Theatre**  
B.F.A. 1970, Florida Atlantic University; M.A. 1972, California State University, Humboldt; M.F.A. 1974, George Washington University
- Howard Morley Sachar, Charles E. Smith Professor of Modern Jewish History**  
B.A. 1947, Swarthmore College; M.A. 1950, Ph.D. 1953, Harvard University
- James Minor Sachlis, Associate Professor of Finance**  
B.S. 1964, M.B.A. 1966, D.B.A. 1975, University of Maryland
- Bonnie Melinda Sachs, Assistant Professor of German**  
B.A. 1984, New York University; M.A. 1986, Ph.D. 1989, Princeton University
- Pilar G. Suelto de Sáenz, Professor of Spanish**  
Licenciada 1953, University of Madrid; M.A. 1957, Bryn Mawr College; Ph.D. 1966, University of Maryland
- Christopher E. Sager, Assistant Professor of Psychology**  
B.A. 1985, San Diego State University; Ph.D. 1990, University of Minnesota
- Debabrata Saha, Associate Professor of Engineering and Applied Science**  
B.S. 1976, B.Tech. 1979, University of Calcutta, India; M.A.S. 1982, University of Toronto, Canada; Ph.D. 1986, University of Michigan
- Linda Bradley Salamon, Professor of English; Dean of Columbian College and Graduate School of Arts and Sciences**  
B.A. 1963, Radcliffe College; M.A. 1964, Ph.D. 1971, Bryn Mawr College
- Hideo Sambe, Associate Research Professor of Chemistry**  
B.S. 1961, Tokyo Institute of Technology, Japan; M.S. 1964, New Mexico Highlands University; Ph.D. 1973, University of Chicago
- Pedro P. Sanchez, Associate Professor of Management Science**  
B.A. 1963, M.A. 1965, University of Florida; Ph.D. 1972, University of Michigan
- Burton Malcolm Sapin, Professor of Political Science and International Affairs**  
B.A. 1945, M.A. 1947, Columbia University; Ph.D. 1953, Princeton University
- James William Sargent, Assistant Professorial Lecturer in Engineering**  
B.S. 1982, Cornell University; M.S. 1987, George Washington University



- Shahram Sarkani, Associate Professor of Civil Engineering**  
B.S. 1981, M.S. 1981, Louisiana State University; Ph.D. 1987, Rice University
- Marshall Sashkin, Professorial Lecturer in Psychology**  
B.A. 1966, University of California, Los Angeles; Ph.D. 1970, University of Michigan
- Mary Anne Plastino Saunders, Associate Professor of English as a Foreign Language**  
B.A. 1969, M.A. in Ed. 1970, Catholic University of America
- Gail Savage, Assistant Professor of History**  
B.A. 1969, M.A. 1973, Ph.D. 1977, University of Texas
- Donna Scarboro, Adjunct Assistant Professor of English; Director of Summer Sessions and Experimental Programs**  
B.A. 1976, Guilford College; M.A. 1982, Ph.D. 1989, Emory University
- Judy D'Amico Schafer, Associate Professorial Lecturer in Speech and Hearing**  
B.A. 1972, M.A. 1973, Loyola College; Ph.D. 1979, University of Maryland; J.D. 1986, Georgetown University
- Michael J. Schaffer, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.S. 1971, M.A. 1983, University of Maryland
- Kenneth F. Schaffner, University Professor of Medical Humanities and Professor of Philosophy**  
B.S. 1961, City University of New York, Brooklyn College; Ph.D. 1967, Columbia University; M.D. 1986, University of Pittsburgh
- James Hermon Scharen-Guivel, Professorial Lecturer in Engineering**  
Ph.D. 1966, Cambridge University; M.S. 1972, Purdue University
- Charles Frank Scheffey, Adjunct Professor of Engineering**  
B.S.C.E. 1943, Drexel University; M.S.C.E. 1951, University of California, Berkeley; D.Sc. 1984, George Washington University
- Fritz Scheuren, Professorial Lecturer in Statistics**  
B.A. 1963, Tufts University; Ph.D. 1972, George Washington University
- Stefan Otto Schiff, Professor of Zoology and of Genetics**  
B.S. 1952, Roanoke College; Ph.D. 1964, University of Tennessee, Knoxville
- Richard Harold Schlagel, Elton Professor of Philosophy**  
B.S. 1949, Springfield College; M.A. 1952, Ph.D. 1955, Boston University
- Kurt James Schmucker, Assistant Professorial Lecturer in Engineering**  
B.S. 1973, M.S. 1974, Michigan State University; M.S. 1977, Johns Hopkins University
- Allan Schneider, Adjunct Professor of Engineering**  
B.S. in E.E. 1959, B.S.E.P. 1960, Lehigh University; M.S. in E.E. 1962, Columbia University; Ph.D. 1974, University of Maryland
- John R. Schoneboom, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1986 Hampshire College
- Carol Taylor Schrader, Adjunct Assistant Professor of Teacher Education**  
B.S. 1958, M.Ed. 1961, University of Nebraska
- Evelyn Jaffee Schreiber, Adjunct Assistant Professor in English**  
B.A. 1970, Simmons College; M.A. 1971, Colorado State University; Ph.D. 1977, University of Colorado
- Stuart Alan Schulman, Adjunct Instructor in Travel and Tourism**  
B.B.A. 1962, City University of New York, City College; M.B.A. 1970, New York University; Ed.D. 1988, George Washington University
- John M. Schumpert, Professorial Lecturer in Engineering**  
B.S. 1961, Clemson University; M.S. 1965, Ph.D. 1967, Northwestern University
- David R. Schwandt, Associate Professor of Human Resource Development**  
B.S. 1967, Eastern Michigan University; M.A. 1969, Western Michigan University; Ph.D. 1978, Wayne State University
- Lois Green Schwoerer, Elmer Louis Kayser Professor of History**  
B.A. 1949, Smith College; M.A. 1952, Ph.D. 1956, Bryn Mawr College
- William E. Seale, Professor of Finance**  
B.A. 1963, M.S. 1968, Ph.D. 1975, University of Kentucky
- Ormond Albert Seavey, Professor of English**  
B.A. 1966, Carleton College; M.A. 1967, Ph.D. 1976, Columbia University
- Frank William Segel, Professor of Accountancy**  
B.S. 1959, Johns Hopkins University; M.B.A. 1964, M.Phil. 1971, Ph.D. 1972, George Washington University

- Barbara Rae Seidman, Adjunct Instructor in Harp**  
Mus.B. 1969, Cleveland Institute of Music; Mus.M. 1970, Northwestern University
- Susan Kathleen Sell, Assistant Professor of Political Science**  
B.A. 1979, Colorado College; M.A. 1980, Ph.D. 1989, University of California, Santa Barbara
- Hikmet Senay, Assistant Professor of Engineering and Applied Science**  
B.S. 1979, Istanbul Technical University, Turkey; M.S. 1982, M.S. 1986, Ph.D. 1987, Syracuse University
- Joseph John Seppy, Associate Professorial Lecturer in Engineering**  
B.E. 1973, Villanova University; M.S. 1981, George Washington University
- David Edward Sewell, Instructor in Naval Science**  
B.S. 1987, United States Naval Academy
- Muhammed Tariq Shams, Associate Professorial Lecturer in Physics**  
B.S. 1972, Ph.D. 1978, George Washington University
- Wayne C. Shanks, Associate Professorial Lecturer in Geology**  
B.S. 1960, Michigan State University; M.S. 1971, Louisiana State University; Ph.D. 1976, University of Southern California
- Debra R. Sheldon, Professor of Accountancy**  
B.A. 1969, Northwestern University; M.B.A. 1974, Drexel University; D.B.A. 1981, George Washington University
- Robert Steven Sheldon, Professorial Lecturer in Engineering**  
B.S. 1976, M.S. 1977, University of Minnesota; Ph.D. 1986, Cornell University
- Yin-Lin Shen, Assistant Professor of Engineering and Applied Science**  
B.S. 1980, M.S. 1982, National Chiao-Tung University, Taiwan; Ph.D. 1991, University of Wisconsin
- Francis William Shepherd, Associate Professorial Lecturer in Engineering**  
B.S. 1949, City University of New York, City College; M.S. 1950, University of Minnesota; M.E.A. 1960, D.Sc. 1977, George Washington University
- Stanley Newton Sherman, Professor of Business Administration**  
B.A. 1952, M.B.A. 1960, D.B.A. 1977, University of Maryland
- Michael Charles Sheward, Assistant Professorial Lecturer in Journalism**  
B.J. 1972, University of Missouri
- Chung-wen Shih, Professor of Chinese**  
B.A. 1945, St. John's University, China; M.A. 1949, Ph.D. 1955, Duke University
- Jane Shore, Associate Professor of English**  
B.A. 1969, Goddard College; M.F.A. 1971, University of Iowa
- Mark J. Shuart, Assistant Professorial Lecturer in Engineering**  
B.S. 1976, M.S. 1978, Virginia Polytechnic Institute and State University; Ph.D. 1986, University of Delaware
- John Lee Sibert, Associate Professor of Engineering and Applied Science**  
B.A. 1968, Wittenberg University; M.A. 1971, Miami University (Ohio); Ph.D. 1974, University of Michigan
- Frederic Richard Siegel, Professor of Geochemistry**  
B.A. 1954, Harvard University; M.S. 1958, Ph.D. 1961, University of Kansas
- Carol Kimball Sigelman, Professor of Psychology**  
B.A. 1967, Carleton College; M.A. 1968, Ph.D. 1972, George Peabody College
- Lee Sigelman, Professor of Political Science**  
B.A. 1967, Carleton College; M.A. 1970, Ph.D. 1973, Vanderbilt University
- Gaston Sigur, Distinguished Professor of East Asian Studies**  
B.A. 1947, M.A. 1948, Ph.D. 1957, University of Michigan
- David Elliot Silber, Professor of Psychology**  
B.A. 1958, Wayne State University; M.A. 1960, Ohio University; Ph.D. 1965, University of Michigan
- Joseph Robert Silverman, Adjunct Professor of Engineering**  
B.S. in E.E. 1959, Northeastern University; M.S. 1968, D.Sc. 1977, George Washington University
- Rodica Simion, Associate Professor of Mathematics**  
B.S. 1974, University of Bucharest, Romania; M.S. 1977, Ph.D. 1981, University of Pennsylvania
- Larry G. Singleton, Associate Professor of Accountancy**  
B.S. 1978, M.S. 1980, Ph.D. 1985, Louisiana State University
- Nozer Darabsha Singpurwalla, Professor of Operations Research and of Statistics**  
B.S. 1959, B.V. Bhoomraddi College of Engineering and Technology, India; M.S.(I.E.) 1964, Rutgers University; Ph.D. 1968, New York University
- Myrna Carol Sislen, Adjunct Assistant Professor of Music**  
B.A. 1970, American University



- Earl Franklin Skelton, Professorial Lecturer in Engineering**  
B.S. 1962, Fairleigh Dickinson University; Ph.D. 1967, Rensselaer Polytechnic Institute
- Arthur Hall Smith, Professor of Painting**  
B.F.A. 1951, Illinois Wesleyan University; M.F.A. 1979, George Washington University
- Daniel L. Smith, Associate Professorial Lecturer in Journalism**  
B.F.A. 1973, Virginia Commonwealth University
- David Russell Smith, Professorial Lecturer in Engineering**  
B.S. 1967, Randolph-Macon College; M.S.(E.E.) 1970, Georgia Institute of Technology; D.Sc. 1977, George Washington University
- Keith E. Smith, Associate Professor of Accountancy**  
B.A. 1966, University of Pennsylvania; J.D. 1976, LL.M. 1978, University of Florida
- Peter Plympton Smith, Professor of Education; Dean of the School of Education and Human Development**  
B.A. 1968, Princeton University; M.A.T. 1970, Ed.D. 1984, Harvard University
- Robert McClure Smith, Instructor in English**  
B.A. 1984, University of Strathclyde; M.A. 1989, Ph.D. 1992, University of Massachusetts
- Stephen Charles Smith, Associate Professor of Economics**  
B.A. 1976, Goddard College; M.A. 1981, Ph.D. 1983, Cornell University
- Robert T. Smythe, Professor of Statistics**  
B.A. 1963, Oberlin College; B.A. 1965, Oxford University; Ph.D. 1969, Stanford University
- Michael Joseph Sodaro, Professor of Political Science and International Affairs**  
B.A. 1967, Fordham University; M.A. 1970, Johns Hopkins University; Ph.D. 1978, Columbia University
- Richard Martin Soland, Professor of Operations Research; Acting Associate Dean of the School of Engineering and Applied Science**  
B.E.E. 1961, Rensselaer Polytechnic Institute; Ph.D. 1964, Massachusetts Institute of Technology; P.E.
- Elinor Harris Solomon, Adjunct Professor of Economics**  
B.A. 1944, Mount Holyoke College; M.A. 1945, Ph.D. 1948, Harvard University
- Henry Solomon, Professor of Economics**  
B.A. 1949, City University of New York, Brooklyn College; M.A. 1950, Ph.D. 1959, New York University
- Margaret Rapp Soltan, Associate Professor of English**  
B.A. 1977, Northwestern University; M.A. 1978, Ph.D. 1986, University of Chicago
- Refik Soyer, Associate Professor of Management Science**  
B.A. 1978, Bogazici University, Turkey; M.Sc. 1979, University of Sussex, England; D.Sc. 1985, George Washington University
- Roberta Spalter-Roth, Adjunct Associate Professor of Women's Studies**  
B.A. 1963, Indiana University; Ph.D. 1964, American University
- Ronald H. Spector, Professor of History and of International Affairs**  
B.A. 1964, Johns Hopkins University; M.A. 1966, Ph.D. 1967, Yale University
- James R. Spencer, Jr., Assistant Professorial Lecturer in Art**  
B.S. 1967, Texas A&M University; M.F.A. 1981, George Washington University
- Paul Eppley Spiegler, Associate Professorial Lecturer in Biological Sciences**  
B.S. 1956, University of Maryland; M.A. 1959, George Washington University
- Sheryl Marie Spivack, Instructor in Tourism Studies**  
B.F.A. 1968, Drake University; M.A. in Ed.&H.D. 1987, George Washington University
- Claire B. Sponsler, Assistant Professor of English**  
B.A. 1976, M.A. 1978, University of Cincinnati; Ph.D. 1988, Indiana University
- James Alan Sprague, Professorial Lecturer in Engineering**  
B.A. 1965, B.S. 1966, Ph.D. 1970, Rice University
- Doris Srinivasan, Associate Professorial Lecturer in Art**  
B.A. 1960, City University of New York, Hunter College; Ph.D. 1967, University of Pennsylvania
- Rajagopalan Srinivasan, Professorial Lecturer in Engineering**  
B.Sc. 1960, M.A. 1961, M.Phil. 1979, University of Madras, India; M.S. 1981, Florida State University; Ph.D. 1985, University of Georgia
- Mark Starik, Assistant Professor of Business Administration**  
B.A. 1976, M.A. 1978, University of Wisconsin; Ph.D. 1990, University of Georgia
- Carl Steiner, Professor of German**  
B.A. 1958, M.A. 1962, Ph.D. 1966, George Washington University
- Christopher Willie Sten, Professor of English**  
M.A. 1966, Carleton College; M.A. 1968, Ph.D. 1971, Indiana University

- Jeffrey L. Stephanic, Associate Professor of Photography**  
B.A. 1977, M.F.A. 1980, George Washington University
- George Christopher Stephens, Professor of Geology**  
B.S. 1967, M.S. 1969, George Washington University; Ph.D. 1972, Lehigh University
- Richard Walton Stephens, Professor of Sociology**  
B.A. 1951, Franklin and Marshall College; M.A. 1953, Ph.D. 1956, University of North Carolina
- Christopher H. Sterling, Professor of Communication**  
B.S. 1965, M.S. 1967, Ph.D. 1969, University of Wisconsin
- Arthur Marvin Stern, Professorial Lecturer in Engineering**  
B.S. 1947, M.S. 1948, Ph.D. 1951, University of Illinois
- Bradley R. Stevens, Assistant Professorial Lecturer in Art**  
B.F.A. 1976, M.F.A. 1979, George Washington University
- Robert Gene Stevens, Visiting Professor of Accountancy**  
B.S. 1951, Southern Illinois University; M.S. 1953, Ph.D. 1958, University of Illinois
- Clayton Verne Stewart, Associate Professorial Lecturer in Engineering**  
B.S. 1973, University of Redlands; M.S. 1975, Ph.D. 1978, Air Force Institute of Technology
- Robert P. Stoker, Associate Professor of Political Science**  
B.A. 1976, Ohio State University; M.A. 1979, Ph.D. 1983, University of Maryland
- Eugene Almon Stone, Associate Professor of Mathematics**  
B.A. 1960, Vanderbilt University; Ph.D. 1966, University of Virginia
- Richard Briggs Stott, Associate Professor of History**  
B.A. 1970, Ph.D. 1983, Cornell University
- Robert W. Strand, Associate Professorial Lecturer in Finance**  
B.S. 1974, Davidson College; Ph.D. 1981, University of North Carolina
- Sharon Alice Straw, Lecturer in Counseling**  
B.A. 1985, M.A. 1987, George Washington University
- Patricia Ann Sullivan, Assistant Professor of Exercise Science**  
B.S. 1969, State University of New York College at Cortland; M.S. 1973, Smith College; Ed.D. 1989, George Washington University
- Steven M. Suranovic, Assistant Professor of Economics**  
B.S. 1982, University of Illinois; M.A. 1986, Ph.D. 1989, Cornell University
- Jack Susman, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.S. 1980, University of Pittsburgh; M.S. 1982, George Washington University
- Ellen Moore Suthers, Adjunct Assistant Professor of Anthropology**  
B.A. 1973, Randolph-Macon Woman's College; M.A. 1977, Ph.D. 1987, University of Virginia
- John F. Sutter, Associate Professorial Lecturer in Geology**  
B.S. 1965, Capital University; M.A. 1968, Ph.D. 1970, Rice University
- P.A.V.B. Swamy, Adjunct Professor of Economics**  
M.A. 1957, M.S. 1958, Andhra University, India; Ph.D. 1968, University of Wisconsin
- Robert W. Swezey, Professorial Lecturer in Psychology**  
B.A. 1965, Grove City College; M.A. 1967, American University; Ph.D. 1972, University of Maryland
- Paul Michael Swiercz, Associate Professor of Management Science**  
M.P.H. 1976, University of Michigan; M.S. 1981, Ph.D. 1984, Virginia Polytechnic Institute and State University
- Lynne Taetszch, Instructor in English**  
B.A. 1971, Rutgers University; M.A. 1988, San Diego State University; Ph.D. 1992, Florida State University
- Nematolah Taghavi, Assistant Professor of Mathematics**  
B.S. 1975, University of Maryland; M.A. 1983, American University
- Morton Frank Taragin, Associate Professor of Physics**  
B.S. in Engr 1965, M.Phil 1969, Ph.D. 1970, George Washington University
- Robert Morris Tarakan, Assistant Professorial Lecturer in Engineering**  
B.S. 1977, Rensselaer Polytechnic Institute; M.S. 1981, George Washington University
- Claudia Tate, Professor of English**  
B.A. 1968, University of Michigan; M.A. 1971, Ph.D. 1977, Harvard University
- Robert Frederick Teitel, Associate Professorial Lecturer in Statistics**  
B.A. 1966, City University of New York, City College
- Douglas Harold Teller, Professor of Design and Graphics**  
B.A. 1956, Western Michigan University; M.F.A. 1962, George Washington University
- Edwin C. Thayer, Adjunct Instructor in French Horn**  
B.M. 1957, M.M. 1958, University of Illinois



- Jean-François Marie Thibault, Associate Professor of French**  
Baccalaureat 1960, Licence ès Lettres 1964, Diplôme d'Etudes 1965, Academie de Paris; Ph.D. 1976, University of Maryland
- Joan Elizabeth Thiel, Associate Professor of Communication**  
B.A. 1961, Marygrove College; M.F.A. 1971, Catholic University of America; Ph.D. 1975, University of Michigan
- Klaus Thoenelt, Professor of German**  
Staatsexamen 1956, Ph.D. 1961, University of Freiburg, Germany
- Bradford Lewis Thomas, Professorial Lecturer in Geography and Regional Science**  
B.A. 1953, Washington University; M.A. 1958, University of Kansas
- James L. Thomas, Professorial Lecturer in Engineering**  
B.S. 1975, Virginia Polytechnic Institute and State University; M.S. 1980, George Washington University; Ph.D. 1983, Mississippi State University
- Desmond Edwin Thompson, Assistant Research Professor of Statistics**  
B.Sc. 1967, University of the West Indies; M.Sc. 1970, University of British Columbia; Ph.D. 1985, University of Washington
- Irene Becker Thompson, Associate Professor of Russian**  
B.S. 1965, M.S. 1968, Georgetown University; Ph.D. 1984, George Washington University
- Shirley E. Thompson, Assistant Professor of English as a Foreign Language**  
B.A. 1970, Kalamazoo College; M.A. 1977, University of Michigan
- Richard Thornton, Professor of History and International Affairs**  
B.A. 1961, Colgate University; Ph.D. 1966, University of Washington
- James B. Thurman, Associate Professor of Business Administration**  
B.A. 1966, M.B.A. 1972, Ph.D. 1978, Pennsylvania State University
- Max David Ticktin, Assistant Professor of Hebrew**  
B.A. 1942, University of Pennsylvania; M.H.L. 1947, D.D. 1977, Jewish Theological Seminary of America
- Samuel Coakley Tignor, Professorial Lecturer in Engineering**  
B.S.C.E. 1958, Virginia Polytechnic Institute and State University; M.C.E. 1966, Catholic University of America; M.S.E. 1970, Ph.D. 1974, University of Michigan
- Robert Yen-ying Ting, Associate Professorial Lecturer in Engineering**  
B.S. 1964, National Taiwan University; M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1971, University of California, San Diego
- Charles Nelson Toftoy, Associate Professor of Management Science**  
B.S. 1958, U.S. Military Academy; M.B.A. 1969, Tulane University; D.B.A. 1985, Nova University
- Richard Paul Tollo, Assistant Professor of Geology**  
B.A. 1972, Tufts University; M.S. 1976, University of New Hampshire; Ph.D. 1982, University of Massachusetts
- Robert Heath Tolson, Research Professor of Engineering and Applied Science**  
B.S. 1958, M.S. 1963, Virginia Polytechnic Institute and State University; Ph.D. 1990, Old Dominion University
- Blaza Toman, Assistant Professor of Statistics**  
B.S. 1975, Wright State University; M.S. 1977, State University of New York at Buffalo; Ph.D. 1987, Ohio State University
- Christopher Mark Toppe, Associate Professorial Lecturer in Statistics**  
B.Ed. 1970, M.Ed. 1971, Ph.D. 1978, University of Florida
- Theodore George Toridis, Professor of Engineering and Applied Science**  
B.S. 1954, Robert College, Turkey; M.S. 1961, Ph.D. 1964, Michigan State University
- Stephen Joel Trachtenberg, Professor of Public Administration; President of the University**  
B.A. 1959, Columbia University; J.D. 1962, Yale University; M.P.A. 1966, Harvard University; L.H.D. 1986, Trinity College (Connecticut); LL.D. 1990, Hanyang University, Korea
- Marie M. Travis, Adjunct Assistant Professor of Communication**  
B.S. 1976, M.F.A. 1983, University of Maryland
- Carl Augustus Troester, Jr., Adjunct Professor of Exercise Science and Tourism Studies**  
B.S. 1937, Northeast Missouri State University; M.A. 1938, University of Missouri; Ed.D. 1942, Columbia University
- Joseph Louis Tropea, Associate Professor of Sociology**  
B.A. 1962, Wayne State University; M.A. 1965, Michigan State University; Ph.D. 1973, George Washington University
- Robert P. Trost, Professor of Economics**  
B.M.E. 1969, University of Detroit; Ph.D. 1977, University of Florida

**Steven A. Tuch, Associate Professor of Sociology**

B.A. 1973, University of Massachusetts; M.A. 1976, Emory University; Ph.D. 1981, Pennsylvania State University

**Richard W. Tucker, Assistant Professor of English as a Foreign Language**

B.A. 1971, Bowling Green State University; M.A. 1976, University of Michigan

**Belle Patricia Tyndall, Associate Professor of English as a Foreign Language**

B.A. 1967, M.A. 1979, University of London, England; Ph.D. 1988, Georgetown University

**Douglas Henry Ubelaker, Professorial Lecturer in Anthropology**

B.A. 1968, Ph.D. 1973, University of Kansas

**Daniel H. Ullman, Associate Professor of Mathematics**

B.A. 1979, Harvard University; Ph.D. 1985, University of California, Berkeley

**Stuart A. Umpleby, Professor of Management Science**

B.S., B.A. 1967, M.A. 1969, Ph.D. 1975, University of Illinois

**Joan B. Urban, Professorial Lecturer in International Affairs and History**

B.A. 1956, Northwestern University; M.A. 1959, Ph.D. 1967, Harvard University

**Peter B. Vaill, Professor of Human Systems**

B.A. 1958, University of Minnesota; M.B.A. 1960, D.B.A. 1964, Harvard University

**Roberto Valero, Assistant Professor of Spanish**

B.A. 1978, M.A. 1980, University of Havana, Cuba; Ph.D. 1988, Georgetown University

**Clyde James VanArsdall III, Professor of Naval Science**

B.S. 1963, U.S. Naval Academy; M.B.A. 1974, George Washington University

**Emanuel Vegh, Professorial Lecturer in Mathematics**

B.A., M.A. 1960, University of Delaware; Ph.D. 1963, University of North Carolina

**Isabel Rodriguez Vergara, Assistant Professor of Spanish**

B.A. 1974, Universidad Nacional de Colombia; M.A. 1977, Ph.D. 1988, Cornell University

**Thomas Verghese, Assistant Professor of Accountancy**

B.S.E.E. 1970, University of Madras; M.S. 1980, University of Houston; Ph.D. 1988, Columbia University

**Dante Verme, Assistant Research Professor of Statistics**

B.A. 1973, Universidad del Pacifico, Peru; M.A. 1983, Ph.D. 1990, George Washington University

**Donald Eugene Vermeer, Professor of Geography and Regional Science**

B.A. 1954, M.A. 1959, Ph.D. 1964, University of California, Berkeley

**Joel I. Verter, Research Professor of Statistics**

B.S. 1965, City University of New York, City College; M.S. 1967, University of Massachusetts; Ph.D. 1979, University of North Carolina

**Akos Vertes, Associate Professor of Chemistry**

B.Sc. 1974, M.Sc. 1976, Ph.D. 1979, Eotvos Lorand University, Hungary

**Kanoknart Visudtibhan, Assistant Professor of International Business**

B.Comm. 1976, University of Western Australia; M.B.A. 1978, University of New South Wales, Australia; Ph.D. 1988, University of Pennsylvania

**Arthur Viterito, Assistant Professor of Geography and Regional Science**

B.A. 1973, Long Island University; M.A. 1976, State University of New York at Albany; Ph.D. 1980, University of Denver

**John Michael Vlach, Professor of American Civilization**

B.A. 1970, University of California, Davis; M.A. 1972, Ph.D. 1975, Indiana University

**Branimir Radovan Vojcic, Assistant Professor of Engineering and Applied Science**

Dipl.Eng. 1980, M.S. 1986, D.Sc. 1989, University of Belgrade, Yugoslavia

**Barbara Ann von Barghahn-Calvetti, Professor of Art**

B.A. 1970, University of Iowa; M.A. 1972, Ph.D. 1979, New York University

**Ernst Theodore von Briesen, Assistant Professorial Lecturer in Engineering**

B.A. 1965, Harvard University

**Nicholas S. Vonortas, Assistant Professor of Economics and of International Affairs**

B.A. 1981, University of Athens, Greece; M.A. 1982, University of Leicester, England; M.Phil. 1987, Ph.D. 1989, New York University

**Clemmont Eyvind Vontress, Professor of Counseling**

B.A. 1952, Kentucky State College; M.S. 1956, Ph.D. 1965, Indiana University

**Muriel Von Villas, Director of Vocal Theatre Workshop**

B.M. 1977, Boston Conservatory of Music

**Alan Gerard Wade, Professor of Theatre**

B.A. 1968, Ph.D. 1981, Northwestern University; M.A. 1972, Catholic University of America

**Charles Matthew Waespy, Associate Professorial Lecturer in Engineering**

B.S. 1951, U.S. Naval Academy; M.S. 1954, Massachusetts Institute of Technology; Ph.D. 1967, University of California, Los Angeles; M.B.A. 1978, Loyola College (Maryland)



- Donald K. Wagner, Professorial Lecturer in Engineering**  
B.S. 1978, University of Wisconsin; M.S. 1980, Ph.D. 1983, Northwestern University
- Pradeep Kumar Wahi, Associate Professorial Lecturer in Engineering**  
B. Tech. 1972, M.Tech. 1976, Indian Institute of Technology, India; M.S. 1978, State University of New York at Stony Brook
- Eugene Allen Walker, Assistant Professorial Lecturer in Engineering**  
B.S. 1966, University of Maine; M.S. 1972, George Washington University
- Robert Harris Walker, Jr., Professor of American Civilization**  
B.S. 1945, Northwestern University; M.A. 1950, Columbia University; Ph.D. 1955, University of Pennsylvania
- Dewey Diaz Wallace, Jr., Professor of Religion**  
B.A. 1957, Whitworth College; B.D. 1960, Princeton Theological Seminary; M.A. 1962, Ph.D. 1965, Princeton University
- Ruth Ann Wallace, Professor of Sociology**  
B.A. 1961, Immaculate Heart College; M.A. 1963, University of Notre Dame; Ph.D. 1968, University of California, Berkeley
- Tara Ghoshal Wallace, Assistant Professor of English**  
B.A. 1973, Bryn Mawr College; M.A. 1975, Ph.D. 1981, University of Toronto
- John D. Waller, Professorial Lecturer in Engineering**  
B.S. 1959, Rockhurst College; M.S. 1962, Ph.D. 1966, University of Notre Dame
- Mitchel B. Wallerstein, Adjunct Associate Professor of International Affairs and Political Science**  
B.A. 1971, Dartmouth College; M.P.A. 1972, Syracuse University; Ph.D. 1978, Massachusetts Institute of Technology
- David A. Walsh, Lecturer in English**  
B.A. 1948, M.A. 1983, M.I.P.P. 1983, Johns Hopkins University
- Todd Leon Walton, Jr., Assistant Professorial Lecturer in Engineering**  
B.S. 1970, University of Cincinnati; M.S. 1972, Ph.D. 1979, University of Florida
- Chai-Ho Charles Wang, Professorial Lecturer in Engineering**  
B.A. 1964, Fort Lewis College; M.A. 1968, University of Washington; Ph.D. 1974, University of Denver
- George Ching Yuan Wang, Assistant Professor of Chinese**  
B.A. 1951, Taiwan Normal University; M.S. 1955, Tokyo University of Education
- Andrew B. Wardlaw, Jr., Associate Professorial Lecturer in Engineering**  
B.S. 1967, Bucknell University; M.S. 1968, Ph.D. 1971, University of Pennsylvania
- Christopher Walden Warner, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1972, Williams College; J.D. 1976, University of Miami; M.S. 1982, American University
- Edward L. Warner III, Adjunct Professor of International Affairs and Political Science**  
B.S. 1962, U.S. Naval Academy; M.A. 1967, Ph.D. 1975, Princeton University
- Clay Warren, Chauncey M. Depew Professor of Communication**  
B.S. 1968, U.S. Naval Academy; M.A. 1973, Ph.D. 1976, University of Colorado
- Wilcomb Edward Washburn, Professorial Lecturer in American Civilization**  
B.A. 1948, Dartmouth College; Ph.D. 1955, Harvard University
- Wasył Wasyłkiwskyj, Professor of Engineering and Applied Science**  
B.E.E. 1957, City University of New York, City College; M.S. in E.E. 1965, Ph.D. 1968, Polytechnic University
- Eric Neil Waters, Adjunct Instructor in Guitar**  
B.Mus. 1990, George Mason University
- Robert Charles Waters, Professor of Engineering Management**  
B.S. 1956, M.B.A. 1963, University of California, Los Angeles; D.B.A. 1968, University of Southern California
- Harry S. Watson, Professor of Economics**  
B.A. 1971, Ph.D. 1981, Indiana University
- Ann Gordon Webster, Lecturer in Anthropology**  
B.A. 1950, Wellesley College; M.A. 1979, George Washington University
- Gail D. Weiss, Assistant Professor of Philosophy**  
B.A. 1981, Denison University; M.A. 1982, Ph.D. 1991, Yale University
- Ronald Weitzer, Associate Professor of Sociology**  
B.A. 1975, University of California, Santa Cruz; M.A. 1978, Ph.D. 1985, University of California, Berkeley
- Stephen William Wellman, Adjunct Instructor in Music**  
Mus.B. 1974, North Carolina School of the Arts

**Elizabeth Fortson Wells, Assistant Professor of Botany**

B.A. 1965, Agnes Scott College; M.A. 1970, Ph.D. 1977, University of North Carolina

**William Gaynor Wells, Jr., Associate Professor of Management Science**

B.S. 1947, University of Chicago; M.S. 1961, Purdue University; D.B.A. 1977, George Washington University

**Beverly Jean Westerman, Adjunct Instructor in Exercise Science and Tourism Studies**

B.S. 1981, Western Kentucky University; M.Ed. 1983, University of Virginia

**Robert Paul Weston, Assistant Professorial Lecturer in Engineering**

B.S. 1972, M.S. 1974, Ph.D. 1981, University of Florida

**Benjamin Whang, Adjunct Professor of Engineering**

B.C.E. 1959, M.C.E. 1961, Polytechnic University; Ph.D. 1968, Massachusetts Institute of Technology

**Nancy Winegardner Whichard, Instructor in English**

B.A. 1967, Purdue University; M.A. 1971, University of Georgia

**David Gover White, Professor of Chemistry**

B.Ch.E. 1950, Cornell University; Ph.D. 1954, Harvard University

**Jane Elizabeth White, Adjunct Assistant Professor of Music**

Mus.B. 1950, University of Rochester; M.A. 1963, American University

**Richard Otis White, Adjunct Instructor in Oboe**

Mus.B. 1950, University of Rochester

**John Lindsey Whitesides, Jr., Professor of Engineering and Applied Science**

B.S. 1965, Ph.D. 1968, University of Texas

**Susan Louise Wiley, Assistant Professor of Political Science**

B.S. 1971, Georgia Institute of Technology; Ph.D. 1987, University of Maryland

**Susan P. Willens, Assistant Professor of English**

B.A. 1954, University of Michigan; M.A.T. 1956, Yale University; Ph.D. 1972, Catholic University of America

**Frank Leroy Willingham, Jr., Associate Professorial Lecturer in Engineering**

B.S. 1961, University of Florida; M.S. 1976, University of Maryland

**Charles Winklehaus, Associate Professorial Lecturer in Engineering**

B.C.E. 1951, M.C.E. 1957, Polytechnic University; Ph.D. 1970, University of Michigan

**Erik Kenelm Winslow, Professor of Behavioral Sciences**

B.S. 1963, Pennsylvania State University; M.S. 1965, Ph.D. 1967, Case Western Reserve University

**Philip William Wirtz, Professor of Management Science and of Psychology**

B.A. 1971, Ph.D. 1983, George Washington University; M.S. 1974, Purdue University

**Maida Rust Withers, Professor of Dance**

B.A. 1958, Brigham Young University; M.S. 1960, University of Utah

**Sharon Lee Wolchik, Professor of Political Science and International Affairs**

B.A. 1970, Syracuse University; M.A. 1972, Indiana University; Ph.D. 1978, University of Michigan

**Alfred Abraham Wolf, Professorial Lecturer in Engineering**

B.S.(E.E.) 1948, Drexel University; M.S.(E.E.) 1954, Ph.D. 1958, University of Pennsylvania; Sc.D. 1977, M.D. 1978, University of Juarez

**William Bruce Wood, Associate Professorial Lecturer in Geography and Regional Science**

B.S. 1980, University of California, Berkeley; M.U.R.P. 1982, Ph.D. 1985, University of Hawaii

**Pamela Jane Woodruff, Lecturer in Psychology**

B.A. 1976, George Washington University

**William Thomas Woodward, Professor of Painting**

B.A. 1957, M.A. 1961, American University

**John Franklin Wright, Jr., Professor of Drawing and Graphics**

B.A. 1954, American University; M.A. 1960, University of Illinois

**John R. Wright, Professor of Political Science**

B.A. 1976, M.A. 1978, Northern Illinois University; M.A. 1981, Ph.D. 1983, University of Rochester

**Shirley Minkewitz Wright, Associate Professor of English as a Foreign Language**

B.S. 1954, Winona State University; M.A. 1963, University of Michigan; Ph.D. 1971, Georgetown University

**William Ralph Wright, Adjunct Instructor in Clarinet and Saxophone**

Diploma 1951, Curtis Institute of Music; M.M. 1971, D.M.A. 1977, Catholic University of America

**Jeremy S. Wu, Associate Professorial Lecturer in Statistics**

B.A. 1974, M.A. 1976, Ph.D. 1983, George Washington University



**William W. Wu, Professorial Lecturer in Engineering**

B.S.E.E. 1961, Purdue University; M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1976, Johns Hopkins University

**Michael Yachnis, Adjunct Professor of Engineering**

B.S. 1943, Military Academy, Greece; M.S. 1956, M.E.A. 1962, D.Sc. 1968, George Washington University

**Harry Elwood Yeide, Jr., Professor of Religion**

B.A. 1953, Williams College; B.D. 1957, Union Theological Seminary; Ph.D. 1966, Harvard University

**Anthony Marvin Yezer, Professor of Economics**

B.S. 1966, Dartmouth College; M.S. 1967, London School of Economics and Political Science; Ph.D. 1974, Massachusetts Institute of Technology

**Richard Yi-chang Yin, Associate Professor of Economics and International Affairs**

L.L.B. 1946, Fu Jen University, China; M.A. 1950, University of Denver; Ph.D. 1966, Columbia University

**Laura S. Youens, Associate Professor of Music**

B.Mus. 1969, Southwestern University; M.Mus. 1973, Ph.D. 1978, Indiana University

**Mark Arthur Youngren, Assistant Professorial Lecturer in Engineering**

B.S. 1976, Michigan State University; M.S. 1982, University of Northern Colorado; M.S. 1983, Naval Postgraduate School; D.Sc. 1988, George Washington University

**Abdou Youssef, Assistant Professor of Engineering and Applied Science**

B.S. 1981, B.S. 1982, Lebanese University; M.A. 1985, Ph.D. 1988, Princeton University

**Mona Elwakkad Zaghoul, Professor of Engineering and Applied Science**

B.S.(E.E.) 1965, Cairo University, Egypt; M.S.(E.E.) 1970, M.Math. 1971, Ph.D. 1975, University of Waterloo, Canada

**David Laster Zalkind, Associate Professor of Quantitative Methods and Management Information**

B.A. 1967, Harvard University; M.S. 1968, Stanford University; Ph.D. 1972, Johns Hopkins University

**Richard Bruce Zamoff, Associate Professorial Lecturer in Sociology**

B.A. 1961, M.A. 1963, Ed.D. 1968, Columbia University

**Maria Cecilia Zea, Assistant Professor of Psychology**

Psychologist 1981, Pontificia Universidad Javeriana, Colombia; M.A. 1987, Ph.D. 1990, University of Maryland

**Chunmiao Zheng, Assistant Professorial Lecturer in Geology**

B.S. 1983, Chengdu College of Geology; Ph.D. 1988, University of Wisconsin

**Arthur Jay Ziffer, Associate Professorial Lecturer in Engineering**

B.S. 1952, City University of New York, Queens College; M.S. 1954, University of Chicago

**Abbie Ziffren, Assistant Professorial Lecturer in Religion**

B.A. 1963, University of Chicago; M.A. 1976, Ph.D. 1984, University of Wisconsin

**Samuel Leo Zimmerman, Associate Professorial Lecturer in Engineering**

B.C.E. 1969, M.C.E. 1970, Cornell University

**Jeffrey A. Zinn, Associate Professorial Lecturer in Geography and Regional Science**

B.A. 1967, University of Vermont; M.A. 1970, University of Rhode Island; Ph.D. 1972, Oregon State University

**John Edmund Ziolkowski, Professor of Classics**

B.A. 1958, Duke University; Ph.D. 1983, University of North Carolina

**Artley Joseph Zuchelli, Professor of Physics**

B.A. 1955, Ph.D. 1958, University of Virginia

## ADMISSIONS

The University is coeducational and accepts applications for admission each semester and summer session.

The application for admission has two parts—the preliminary application (part 1) and the application (part 2). The preliminary application for admission to degree candidacy should be accompanied by a \$45 application fee. The fee must be paid by check or postal money order, payable to The George Washington University. The application fee is waived for students applying for readmission who were registered as degree candidates at the time of their last registration at this University and who have not since registered at another institution.

Applicants are urged to submit the application form and complete credentials well in advance of the semester or summer session for which they seek admission. Specific dates are given in each section below.

Acceptance is based on evidence of potential for successful study and on available space. The following criteria are considered: degree or major objective related to rigor of program and grades achieved in secondary school or previous college, standardized test scores, relationship between grades and test scores, and recommendations.

### Admission Procedure

Application forms for admission or readmission to undergraduate or nondegree status are available from and should be returned to the Office of Admissions, George Washington University, Washington, D.C. 20052. For detailed admission requirements, see the appropriate college or school in this Bulletin.

### Secondary School Students

#### *Freshmen—Regular Decision*

Preference for places in the entering class will be given to students who submit the preliminary application (part 1) by December 1 and the application (part 2) with required credentials by February 1. Students graduating at midyear who wish to begin college in the spring semester should submit the preliminary application by October 1 and the application (part 2) by November 1.

Applicants from secondary schools must arrange to have sent directly from their schools to the Office of Admissions a complete academic record together with a teacher and a counselor recommendation. This information should be supplied on the appropriate forms in the application packet.

**Entrance Examinations**—Applicants from secondary schools must submit scores on the College Board Scholastic Aptitude Test (SAT) or on the American College Testing (ACT) battery. Submission of scores on College Board Achievement Tests in English composition and mathematics is recommended. Score reports must be sent directly to the Office of Admissions from the testing agency.

#### *Freshmen—Early Decision*

High school seniors applying for fall admission as full-time freshmen with George Washington University as their first choice may wish to take advantage of the Early Decision Program. The three-year secondary school record must be of high quality. To apply for Early Decision, submit the preliminary application for admission by November 1 and the application (part 2) with supporting credentials by December 1; we will mail our decision by January 2. If accepted, you are required to send in your declaration of intent to attend GW, together with appropriate deposits, no later than January 15 and to withdraw all applications



for admission to other colleges and universities. Applicants not accepted for Early Decision will receive full consideration for regular fall admission after review of seventh-term grades.

### **Freshmen—Early Admission Plan**

Exceptionally well-prepared students who have completed the junior year in high school may apply for early admission. This plan is designed for students with the emotional maturity, as well as the academic ability and background, necessary for college entrance. In most cases, applicants accepted for early admission have exhausted academic offerings in secondary school to the extent that remaining for the senior year may not be in the best interests of the students or their schools.

To be considered for early admission, students must

1. demonstrate superior academic performance through the junior year of high school;
2. meet the entrance requirements of the college or division applied to, by completing all required entrance units with the possible exception of the fourth year of English;
3. have the unqualified recommendation of the secondary school principal or counselor;
4. submit two letters of recommendation (in addition to the counselor's) from teachers who can testify to the student's maturity and general readiness to enter college;
5. submit a letter from a parent or guardian supporting early college entrance;
6. arrange to have SAT or ACT scores sent directly to the Office of Admissions by the testing agency;
7. take the College Board Achievement Tests in English composition and mathematics and one other Achievement Test (of the student's choice) and arrange to have the scores sent directly to the Office of Admissions by the testing agency;
8. arrange for an interview with the director of admissions.

### **Transfer Students**

For fall matriculation, undergraduate students from other institutions should submit the preliminary application by May 1 and the application (part 2) with required credentials by June 1. Corresponding dates for spring matriculation are October 1 and November 1; for summer matriculation, March 1 and April 1.

To be accepted for transfer, a student should be in good standing as to scholarship and conduct at all postsecondary institutions previously attended. A student who has been academically dismissed will not normally be considered for admission.

An applicant who has attended one or more institutions of higher education must request each registrar to mail directly to the Office of Admissions a transcript of his or her record, *even if credits were not earned*.

In addition, an applicant must have his or her high school record and College Board or ACT test scores sent to the Office of Admissions directly from the high school and testing agency.

### **Advance Tuition Deposit**

After notification of acceptance, an advance tuition deposit will be required of all full-time undergraduate students, including those readmitted. This deposit is due May 1 for students entering in the fall semester and December 15 for students entering in the spring semester. The deposit is credited toward tuition and is not refundable.

## **Advanced Standing and Advanced Placement**

### ***Credit From Other Institutions of Higher Learning***

Where there is no duplication involved, either through course work or examination, credit may be granted for work successfully completed at other institutions of higher learning. Assignment of transfer credit will depend on the appropriateness of the courses completed elsewhere, the standing of the institution at which the previous work was completed, and the regulations of the division of this University in which the credit is to be applied toward a degree. Transfer credit must satisfy the requirements for the degree sought as stated in this *Bulletin*. Credit may be accepted provisionally or may require validation by examination or completion of higher-level courses in the same sequence. Transfer credit will not be assigned for courses completed with a low-pass grade (D or the equivalent); course work completed in vocational/technical programs (e.g., secretarial studies); or sub-freshman-level remedial work.

In Columbian College and Graduate School of Arts and Sciences, credit assigned for professional courses (those in engineering, education, or business) is limited to 9 credit hours. In the School of Business and Public Management, there is a limitation of three credit hours per course to be assigned for work completed at another institution; students transferring to that school from two-year colleges will receive no more than 60 credit hours to be applied to degree programs at this University. Columbian College and the Elliott School of International Affairs accept a maximum of 66 credit hours from two-year colleges. The School of Education and Human Development will accept no more than 63 credit hours. All transfer students must satisfy the residence and course requirements for degrees sought at this University.

### ***Credit by Examination, from Service Schools, from Noncollegiate Organizations, and by Nontraditional Methods***

Assuming there is no duplication of course work, a maximum of 30 credit hours may be assigned upon admission to the University for any combination of the following except as noted below.

**College Board Advanced Placement (AP) Tests**—On the basis of a score report sent to the Office of Admissions from the Educational Testing Service at the student's request, undergraduate credit is assigned for scores of four or five on all Advanced Placement Tests. Test scores below four are not accepted for assignment of academic credit. The Advanced Placement Tests are administered in the secondary schools in May of each year. Normally only students who complete a course designated as Advanced Placement are prepared for the examination. Arrangements for the examination are the responsibility of the applicant and should be made through the secondary school attended or with the Program Director, College Board, Advanced Placement Tests, CN 6671, Princeton, N.J. 08541-6671.

**College Board College-Level Examination Program (CLEP)**—CLEP offers two types of examinations: General and Subject Examinations. CLEP General Examinations are offered in five areas: English composition, humanities, mathematics, natural sciences, and social sciences and history. CLEP Subject Examinations measure achievement in specific college-level courses and are offered in 30 subjects.

Credit is assigned for the General Examinations, with the exception of the English composition examination, passed at approximately the 50th percentile or above. In the School of Business and Public Management, credit is not assigned for the mathematics examination. In the School of Engineering and Applied Science, credit is not assigned for the mathematics or natural sciences examinations.



Credit is assigned, with some exceptions, for the Subject Examinations passed at the level recommended in the College Board model policy. A student registered in a degree program at this University must seek departmental and dean's approval prior to taking a CLEP Subject Examination for credit to be applied toward the degree. Credit may not be earned by passing the examination after having taken an equivalent course. Arrangements for the examinations are the responsibility of the student and should be made with the College Board College-Level Examination Program, CN 6601, Princeton, N.J. 08541-6601. See the School of Business and Public Management for specific restrictions on CLEP credit for applicants to that school.

*Special Departmental Examinations for Undergraduates*—Credit may be assigned for Special Departmental Examinations administered by Columbian College departments to students enrolled in all undergraduate divisions of the University.

*Credit Earned Through USAFI and DANTES*—Except to students enrolled in the School of Business and Public Management, credit is assigned for approved United States Armed Forces Institute (USAFI) and Defense Activity for Nontraditional Education Support (DANTES) courses.

*Credit from Service Schools*—Except to undergraduates admitted to the School of Business and Public Management, a limited amount of credit may be assigned for selected service school courses. Students seeking such credit should consult the Office of Admissions.

*Credit for Courses Offered Through Correspondence and Television*—Except to undergraduates admitted to the School of Business and Public Management, a limited amount of credit may be assigned for selected courses taught by nontraditional methods, provided that such courses require the student's physical presence during a monitored final examination. Assignment of such credit will require a statement from the sponsoring agency that such an examination was a required part of the course.

#### **Advanced Placement or Waiver by Examination**

Advanced placement or waiver of a requirement will be granted on the basis of scores on Achievement Tests of the College Board as follows:

Achievement Test	Minimum Score	Exemption
English Composition	650	Waives Engl 10
European and/or American History	600	Waives Hist 39-40 and/or 71-72
French, Spanish	650	Waives a two-year language requirement
German, Hebrew, Latin	600	
Russian	700	

A score of 58 or above on the SAT Test of Standard Written English, or a score of 28 or above on the ACT English Usage Test, will waive English 10.

Advanced standing (academic credit) is not assigned on the basis of SAT, ACT, or Achievement Test results.

#### **Division of Continuing Education**

The Office of University Students in the Division of Continuing Education makes on-campus credit courses available to nondegree students. Students who need the approval of the Office of Admissions to register will be so informed when they call to register. Application forms are available from and should be returned to the Office of Admissions. There is no fee for applying to this Division. For

detailed entrance requirements, see Office of University Students under Division of Continuing Education in this Bulletin.

Students in this Division may not take graduate courses in accountancy, business administration, or management science; registration in other courses may be denied students in nondegree status when space is needed for degree students.

A maximum of 45 credit hours earned in the Division of Continuing Education may be applied toward a bachelor's degree in the undergraduate degree-granting schools of the University.

### **Readmission**

Previously registered students who wish to resume studies on campus after discontinuing enrollment for one or more semesters (summer sessions excluded) must apply for readmission. Deadlines for readmission applications from students in good academic standing are the same as those for new applications. Students who discontinued enrollment while on academic probation or under suspension should allow at least one month for appropriate processing of readmission credentials. Students seeking readmission after having attended other institutions of higher education in the interim must have complete official transcripts sent to the appropriate office at this University from all other institutions attended. Students seeking readmission as degree candidates after previous enrollment in nondegree status must submit a standard undergraduate degree application and fee, together with all entrance credentials not previously received or required.

Applicants for readmission are subject to the University regulations in effect at the time of readmission.

The application fee is waived for students applying for readmission after previous enrollment as degree candidates at this University if they have not since registered as degree candidates at another institution.

### **Students From Foreign Institutions**

Applications, required records, and scores on the Test of English as a Foreign Language (see below) should be received from international students no later than February 1 for the fall semester and October 1 for the spring semester. For detailed admission requirements, see the appropriate college or school in this Bulletin.

### **Required Records**

At the time the application is sent, students must have the educational institutions previously attended send directly to the GW Office of Admissions copies of official certificates and records listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from all secondary schools, colleges, and universities attended are required. Records of state examinations and certificates are also required. These records become the property of the University and cannot be returned.

These documents should be in the language in which the institution keeps its official records. If they are in a language other than English, the copies sent should be accompanied by a certified English translation.

### **Language Tests**

All applicants from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL), and the University looks for a minimum score of 550 in considering candidates for



admission. (The School of Business and Public Management requires a minimum score of 600 on a second taking of the TOEFL.) Applicants are responsible for making arrangements to take the test by addressing inquiries to TOEFL, CN 6151, Princeton, N.J. 08541-6151. The completed registration form must be returned well in advance of the semester for which admission is sought. On the application for the TOEFL, students should specify that the scores be sent to the GW Office of Admissions. Registration for the TOEFL does not constitute application for admission to George Washington University.

Admitted students from countries where English is not an official language are also required to take an English as a Foreign Language placement test prior to registering at the University; the placement test is waived for students with a TOEFL score of at least 600. Depending on the results of this test, the student's academic program may be restricted in number and type of courses that can be taken. Students who are required to take English as a Foreign Language courses at an intensive level might not be able to take other courses during that semester. College credit is not granted for English study below the level of standard freshman English courses.

#### **Financial Certificate**

A Financial Certificate must be completed and submitted with the application for admission of all international students planning to study at the University under the authorization of either a student (F) or exchange visitor (J) visa. Satisfactory completion and submission of the Financial Certificate is required for the issuance of a Form I-20 or IAP-66.



### **SPECIAL PROGRAMS**

#### **Secondary Fields of Study**

A program of secondary fields of study has been established within the University to provide opportunities for formal interschool study. Students must be enrolled in a degree program and must be in good academic standing to be eligible to take a secondary field in another school. The secondary fields generally consist of 12 to 18 hours of prescribed courses, depending on the field, with scholarship requirements determined by the school offering the field. Upon satisfactory completion of all requirements, the title of the secondary field of study and the courses taken in support of the field are entered on the student's transcript. For further information, see the brochure "Secondary Fields of Study" available in the offices of the deans or from the Vice President for Academic Affairs.

#### **University Honors Program**

The University began an undergraduate honors program in the spring 1990 semester. Columbian College and Graduate School of Arts and Sciences, the Elliott School of International Affairs, the School of Business and Public Management, and the School of Engineering and Applied Science participate in the University Honors Program. Through the office of the Vice President for Academic Affairs, the program offers a University Symposium for the entire University community and honors courses and special events for students in the

program. Honors courses are listed under Courses of Instruction; additional courses will be listed in the *Schedule of Classes*.

Students must apply for admission to the University Honors Program. Generally, entering freshmen will have high SAT scores and be at or near the top of their high school classes. Applications from other promising students of unusual talent will be seriously considered. Students may apply for entrance to the program as sophomores.

To remain in the program and to graduate with recognition from the program, students must meet specific grade-point average requirements that increase in successive years.

### **Honor Societies**

Honor societies that maintain active chapters at George Washington University include Phi Beta Kappa and Sigma Xi as well as those specific to given academic fields, such as Alpha Epsilon Delta, Beta Alpha Psi, Beta Gamma Sigma, Delta Phi Alpha, Eta Kappa Nu, Omicron Delta Epsilon, Omega Rho, Pi Alpha Alpha, Pi Sigma Alpha, Pi Tau Sigma, Psi Chi, Sigma Delta Pi, Sigma Iota Rho, and Tau Beta Pi. The freshman honor society Phi Eta Sigma is open to qualified students in all undergraduate programs.

### **Study Abroad Programs**

Study abroad programs for the academic year are currently available in England, Czechoslovakia, Germany, Spain, Israel, Japan, China, Chile, and Peru. Students who wish to study in countries not mentioned here should check with the office of the dean of their school or the Study Abroad Office in the Elliott School of International Affairs. Credits earned with acceptable grades are transferable toward the appropriate degree at George Washington University, provided there is no duplication of work done previously. All programs of study abroad must be approved on the required forms by the appropriate faculty and administrative personnel before departure.

Study abroad is available at varying locations during the summer. Information on summer programs abroad is available in the *GW Summer Sessions Announcement*.

### **Joint Degree Programs**

Several joint degree programs are available to undergraduates. Five-year bachelor's/master's programs include the B.A./M.A. in economics, the B.S./M.S. in systems analysis and engineering/operations research, the B.S./M.A. in systems analysis and engineering/economics, the B.A./M.S. in economics/operations research or engineering/economics, the B.A./M.A. in art or psychology/art therapy, the B.S./M.S. in chemical toxicology (chemistry/forensic sciences). See the department or school concerned for specific program requirements.

Three joint degree programs are available for study toward the Doctor of Medicine degree: the integrated B.A./M.D. and the combined B.A./M.D. programs described under Columbian College and Graduate School of Arts and Sciences, and the early selection program described under the School of Medicine and Health Sciences.

### **ROTC**

See Naval Science under Courses of Instruction for the NROTC program at George Washington University.

George Washington University students may enroll through the Consortium in the Army ROTC program offered at Georgetown University, the AFROTC program at the University of Maryland, or the Army ROTC or AFROTC at Howard



University. Scholarships are available. Those interested should contact the ROTC enrollment officer at one of these universities. Limited credit for such courses (primarily advanced ROTC) may be assigned for electives to meet degree requirements at George Washington University; prior approval is required by the dean of the school in which the student is enrolled.

## **DIVISION OF CONTINUING EDUCATION**

*Acting Dean A.O. Smith*

*Assistant Deans B.J. Moreland, G.M. Logan*

### **Introduction**

The Division of Continuing Education administers the University's off-campus credit courses and degree programs. The Division offers noncredit certificate programs, courses and workshops, and conferences and institutes. The staff of instruction for Division programs includes members of the full-time faculty of the University and academically qualified adjunct faculty from the professional community.

### **Office of University Students**

The Office of University Students (OUS) makes on-campus credit courses available to those who are not currently degree candidates at this University. Such students, often employed in government or industry, may be taking courses to enhance their career potential or as a matter of personal interest. They may be candidates for higher degrees at other institutions, sent here for special work as part of a graduate program. They may be undergraduates matriculated elsewhere, taking courses for transfer to their own institution.

All courses except those restricted to medical and law students are open to OUS students, provided there is room in the class and the student has sufficient preparation as determined by the academic departments.

Registration in a given course may be denied OUS students when space is needed for degree candidates. OUS students are not eligible to register for thesis or dissertation research nor for continuous enrollment or leave of absence. OUS requires a minimum registration of 3 credit hours per semester or session, except in special circumstances as approved by the dean.

### **Entrance Requirements**

An academic background appropriate for the program of studies contemplated is required. In addition, the applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission for one calendar year after the effective date of the suspension. An applicant who has been denied undergraduate admission within this University will not be considered for admission as a nondegree student for the same semester for which the application was denied.

Applications for admission through OUS for a fall or spring semester should be obtained from and returned to the Office of Admissions. There is no application fee. For admission requirements for students from foreign institutions, see Admissions. For information on registration, please refer to the *Schedule of Classes*.

### **Regulations**

See Admissions, Fees and Financial Regulations, and University Regulations. Prospective and registered students are urged to acquaint themselves with the regulations concerning attendance and withdrawal under University Regulations. The following specifically apply to all students registered through OUS:

Last day to add a class for credit—end of second week of classes.

Last day to drop a class for credit or to withdraw from the University—  
end of the seventh week of classes.

Equivalent amounts of time apply to the summer sessions.

### **Academic Work Load**

For OUS students, the normal academic work load during the regular academic year is not more than 10 credit hours for a student employed more than 20 hours per week and not more than 18 credit hours for a full-time student. During the summer a student may take a maximum of two courses during any one session. Exceptions to these limits must be approved by the dean.

### **Scholarship Requirements**

A student who fails to maintain the scholarship requirements of OUS may be dismissed from the University. A statement of scholarship requirements is available in the office of the dean. All grades received in OUS remain on the record; scholarship requirements are based on the total record.

**Grades**—See Scholarship Requirements under University Regulations. There is no limitation on the number of courses that may be taken on a pass/no pass basis in OUS; however, there may be a limit on the number that can be transferred to fulfill degree requirements.

### **Incomplete/Authorized Withdrawal**

Conditions under which the grades of I (Incomplete) and W (Authorized Withdrawal) may be assigned are described under University Regulations.

**Changing an Incomplete**—The instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year remains as a grade of I on the student's record.

### **Change in Program of Studies**

**Change Within the Office of University Students**—A student may not change status to that of auditor except with the approval of the dean (see Withdrawal under University Regulations).

**Transfer Within the University**—Transfer to or from OUS may be made only with the approval of the deans concerned. Application for transfer to degree candidacy will be considered only after the completion of at least one semester in OUS or upon request from the college or school to which the student is seeking admission. Students wishing to transfer to degree candidacy must meet the conditions of the college or school to which they are applying. It is the responsibility of the student to consult the college or school concerning conditions to be met and the amount of work transferable.

### **College Courses for Secondary School Students**

Under the auspices of the Office of University Students, well-qualified secondary school students may take college courses for credit in nondegree status at George Washington University. During the academic year, high school juniors and seniors residing in the Washington metropolitan area may enroll in GW courses as part-time, commuting students. Through the Summer Scholar Pro-



gram, precollege students may enroll in a wide variety of summer courses prior to their junior or senior year of high school. Summer Scholars from outside the Washington area reside on campus in a University residence hall. Local residents may choose to use on-campus housing but are not required to do so. The Summer Scholar Program offers diversified cultural, social, and recreational experiences under the supervision of resident advisors.

**Scholarships**—Secondary school students with outstanding academic records and excellent scores on standardized tests will be considered for full-tuition scholarships. Because the awards are based on academic merit rather than financial need, only the application for admission and supporting credentials are required for consideration. The amounts awarded cover tuition only and cannot be applied to housing, meals, or fees.

For further information and an application, please write to the Coordinator, College Courses for Secondary School Students, Office of Admissions, George Washington University, Washington, D.C. 20052.



## SUMMER SESSIONS

Courses are offered during the summer by all degree-granting divisions of the University: Columbian College and Graduate School of Arts and Sciences, the School of Medicine and Health Sciences, the National Law Center, the School of Engineering and Applied Science, the School of Education and Human Development, the School of Business and Public Management, and the Elliott School of International Affairs. During the summer the University also offers special programs that are not available during the regular academic year. Courses are offered during both day and evening hours.

Students who are enrolled at the University for the spring semester may register for the following Summer Sessions without special application. Those who wish degree status may seek admission from the appropriate college or school within the University. Those who do not wish to work toward a degree at the University may apply through the "Quick Entry" process described in the Summer Sessions Announcement.

For a complete statement concerning summer term work, see the Summer Sessions Announcement.



## **STUDENT SERVICES**

### **Office of the Dean of Students**

The Office of the Dean of Students provides counseling and information for students, administers the nonacademic student disciplinary system and student grievance procedures, administers medical withdrawals, and assists in non-academic program development. Staff members are well informed on University policies and the various student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can be obtained from this office. The Office of the Dean of Students oversees several of the student services listed below, including the Student Health Service, the University Counseling Center, Disabled Student Services, International Student Services, the Multicultural Student Services Center, the Career Center, and the Offices of Judicial Affairs and Greek Affairs.

### **Residential Life**

Complete information concerning the University's residence halls is available from the Office of Residential Life, George Washington University.

Admission to the University does not include a room reservation. The student will receive, with the notification of acceptance, University residence hall information, an application for residence hall space or apartment accommodation, and a declaration of intent to attend the University. The application for residence hall space or apartment accommodation must be accompanied by a \$300 non-refundable deposit. The housing deposit is credited toward the first semester's room or apartment charge.

Rooms and apartments are leased for the academic year, with assignments on a first-come, first-served basis. Lease payment must be made in early June for the fall semester, unless the student elects the 10-month payment plan. Please check with Student Accounts for details regarding the 10-month payment plan.

Charges for residence hall space are determined by hall and room size, with the most prevalent cost tentatively set at \$3,882 for the 1993-94 academic year. In the apartment halls the most prevalent charge per student is planned to be \$4,470 for the academic year, with prices ranging higher and lower according to the space provided.

### **Food Service**

Freshmen and sophomores in residence are required to choose one of the following food service plans: the FlexPlan, \$1,600; any 19 meals per week, \$2,530; any 10 or 14 meals per week, \$2,330. A cash card that may be used at most GW food service sites bears a value of \$540 if the 19- or 14-meal plan is chosen, \$730 if the 10-meal plan is chosen, and \$1,600 if the FlexPlan is chosen. Students who observe the Jewish dietary laws can write to make arrangements with the GW Residential Life Office regarding the B'nai B'rith Hillel Foundation Kosher Meal Plan.

### **Student Health Service**

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be arranged by appointment or, during certain hours, secured on a walk-in basis. Many routine lab tests may be performed in the Health Service lab at cost: allergy shots, immunizations, and various lab tests are done at little or no charge. Psychiatric evaluation, crisis intervention, and short-term therapy are available by appointment.



For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Engineering Education Program are not eligible. The bills incurred from all services rendered outside of the Student Health Service (for example, x-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

### **Health and Accident Insurance**

The University recommends that all students be covered by health and accident insurance. For information on group health insurance options offered through the University, students should contact the Student Health Service or Office of the Dean of Students.

### **University Counseling Center**

The University Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their educational goals. Services include (1) short-term individual counseling, crisis intervention, and referral services for personal problems (e.g., academic pressures, relationship or family difficulties); (2) group counseling for personal problems; (3) educational/vocational counseling and testing; (4) workshops designed to address academic or personal development (e.g., test-taking strategies, study skills, communication skills, stress management); (5) consultation with faculty, staff, and student groups about their special needs in designing programs to improve the campus environment.

The Center administers the Miller Analogies Test, GW admissions tests, and special assessments for business and industry. Career counseling and referral services are available to GW faculty, staff, alumni, and individuals from the greater Washington community.

Students with disabilities are asked to call ahead so that arrangements can be made to adapt services or to meet at an accessible site.

### **The Speech and Hearing Center**

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent. Evaluation and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

### **The Writing Center**

In conjunction with the Department of English, the Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence in support of an argument, and presenting the findings of an experiment or the solution to a research problem.

### **Computer Information and Resource Center**

The Computer Information Resource Center (CIRC) provides computer facilities, technical assistance, and information on the use of computers and computer networks. CIRC supports IBM-PC, Apple Macintosh, and IBM mainframe computers. The CIRC computer laboratories are open seven days a week: 24 hours a day during the academic year and all day and evening at all other times. CIRC also maintains computer classrooms on campus; students generally have access to these rooms when classes are not in session.

In cooperation with the Gelman Library, GW Television, and Telecommunications Services, CIRC publishes a periodic newsletter on computing issues. CIRC gives seminars and offers technical advice to faculty and students regarding use of the IBM mainframe, IBM personal computers, Apple Macintosh personal computers, and the GW Data Network. Students and faculty may receive assistance from CIRC for microcomputer selection and acquisition. CIRC administers and can make recommendations on various discount-purchase programs for microcomputer equipment.

Any University student may have access to the computer facilities for individual research, class projects, and thesis or dissertation study.

### **Career Center**

The Career Center provides career planning and job-seeking assistance as well as a cooperative education program. Services include work-study; full-time and part-time job listings; career consulting; workshops (e.g., organizing job searches, resume and letter writing, effective interviewing); a resource library of career field and employer literature; on-campus interviews for students and alumni one year before and six months after graduation; a resume referral service; resume critiques; a call-in job listings service; and a credentials service that supports employment and graduate/professional school applications. Cooperative education integrates academic study with related professional work experience. Students apply the theory learned in the classroom to work settings directly related to their career interests. Cooperative education offers an educational strategy whereby students engage in the campus classroom and the world-of-work "laboratory," alternating their academic programs with sustained periods of study-related, employer-paid work.

### **International Services Office**

The International Services Office provides services to GW's international students, scholars, faculty, and staff. The office provides advising on a variety of personal issues, including cultural adjustment, living conditions, academic concerns, and finances; provides immigration assistance and information on U.S. government requirements and regulations specific to the international community; conducts orientation programs to assist in living, studying, and working in the United States; and serves as a resource center for the University community on issues of cross-cultural understanding.

### **Disabled Student Services**

The Disabled Student Services office works to assure that the special services necessary for disabled students to participate fully in their academic programs and the extracurricular life of the campus are provided for them through University or community resources.

### **Multicultural Student Services Center**

The Multicultural Student Services Center provides academic, co-curricular, and personal support services for all GW minority students to enhance minority



student life at GW. Through the Center, minority students receive orientation to the various University resources, and are made aware of the many cultural activities and programs that exist on campus and in the greater metropolitan area. The Center provides professional and peer counseling, course advising, tutorial services, and campus and community mentoring programs. The staff is available to address students' academic and personal concerns.

In addition, the Center enhances the quality of ethnic minority student life through the sponsoring of co-curricular activities and leadership training. The Center houses a resource center with computers for student use, reference books and instructional materials, a test file, and an information center. The Multicultural Student Services Center oversees the Partners in Academics and Leadership Program (formerly the Educational Opportunity Program) and various preparatory and precollege programs.

#### **Partners in Academics and Leadership Program**

The Partners in Academics and Leadership Program, a component of the Multicultural Student Services Center, provides selected District of Columbia students with financial aid, academic support services, and personal advising to assist them in pursuing undergraduate work at George Washington University. The staff coordinates a precollege program as well as educational and cultural activities to promote the success and enhance the experience of program participants.

The staff administers the High School/College Internship Program (HI/SCIP), which enrolls highly motivated District of Columbia high school seniors. Participants enroll at GW as nondegree candidates, taking a maximum of 6 credit hours per semester in addition to their high school curriculum. Application to the HI/SCIP program is made through the student's high school guidance office.

#### **Office of Campus Life**

The Office of Campus Life furthers the educational mission of the University by offering programs, services, and facilities that foster the personal, professional, social, and cultural development of members of the University community. The Office of Campus Life is responsible for the Office of Residential Life, Campus Activities Office, Cloyd Heck Marvin Center, and Campus Life Publications and Information Services. Staff members assist individual students, campus organizations, and the University community with event planning, program coordination, and participation in special projects. The staff can also help in interpreting University policies and procedures that affect student life. Additional information about the services offered by the Office of Campus Life, and about the various student organizations and committees, can be obtained from the *Student Handbook*.

#### **Campus Activities Office**

The Campus Activities Office provides administrative support to the University Program Board and other groups planning major events. Other services include advisement of campus organizations, registration of student organizations, leadership training, planning and coordination of major campus events, and oversight of the Office of Community Services, the Off-Campus Housing Resource Center, and the Diversity Program Clearinghouse.

**Program Board**—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees

on the arts, concerts, festivals, films, parties, political affairs, and public relations.

**Student Government**—The George Washington University Student Association is comprised of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at the University. The Student Association provides various services for students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees, advisory councils of the schools and college, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

**Student Organizations**—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 200 registered organizations on campus, covering a broad spectrum of interests, including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as social fraternities and sororities.

#### **Campus Life Publications and Information Services**

This department produces several publications, including the *Student Handbook*, *Guide to Off-Campus Housing*, and the monthly arts and entertainment calendar, and advises student publications, such as the *Hatchet* and *Cherry Tree*. The department also supervises the GW Information Center and the Colonnade Gallery.

#### **The Cloyd Heck Marvin Center**

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes four dining locations, a theatre, lounges, recreational facilities, study rooms, conference and meeting rooms, the Off-Campus Housing Resource Center, Information Center, Colonnade Gallery, travel agency, computer store, bookstore, and newsstand with Ticketmaster. The Marvin Center provides facilities for programs conducted by the University Program Board, by academic departments that include the performing arts, and by other University organizations.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.

#### **Religious Life**

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their own choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling and together constitute the Board of Chaplains to enhance religious life on campus. Religious services and special observances are also provided for the University community as announced.



### Major Program Events

**Art Exhibits**—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade art gallery of the Marvin Center. Student art exhibits are presented each semester.

**Concert Series**—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout each year. Other concerts are held regularly in the Marvin Center, Lisner Auditorium, and the Smith Center.

**Dance**—The GW Dance Company presents major concerts, informal studio performances, experimental events, television appearances, and lecture-demonstrations. Students may audition to become company members and have the opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

**Glee Club, Jazz Band, and Orchestra**—The University Glee Club, Jazz Band, and Orchestra are available to students either as credit courses or as cocurricular activities. All of these organizations present major performances to the University community several times a year, including regular winter and spring concerts.

**International Programs**—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

**Program Board**—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

**Theatre**—The University Theatre produces four or five major plays and musicals during the year on the proscenium/thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre. Students can participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

### Department of Athletics and Recreation

The Charles E. Smith Center for Physical Education and Athletics offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track; a swimming pool; gymnastic and weight rooms; handball and squash courts; and a sauna and lockers. Based in the Smith Center, the Department of Athletics and Recreation offers a broad program of intramural and recreational activities designed to accommodate various levels of skill, experience, and interest.

The University is a member of the National Collegiate Athletic Association and the Atlantic Ten Conference. Its women's and men's intercollegiate varsity teams compete against major universities throughout the Midwest and Eastern Seaboard in such sports as basketball, baseball, soccer, tennis, golf, cross-country, crew, swimming and diving, water polo, badminton, volleyball, and gymnastics.

## FINANCIAL AID

George Washington University offers a program of financial assistance for undergraduate and graduate students. Undergraduate aid consists of two basic types: awards for academic achievement or talent without reference to financial circumstances (merit scholarships) and scholarships, grants, loans, and employment based on academic achievement and demonstrated financial need. All undergraduate gift aid (institutional scholarships and grants and federal grants) requires that the recipient be working on the first undergraduate degree and be registered for a full-time course load at GW. Loans and resident assistantships not based on financial need are available.

Gift aid (scholarships, grants, fellowships, assistantships, etc.) is taxable to the extent that it exceeds the allowable costs of tuition, fees, and required books and supplies or is dedicated to other costs, such as room and board. Federal grants may be taxable if, together with other gift assistance, they exceed the allowable costs.

In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade point average for particular awards and are not financially encumbered by any other University office. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

### Merit Aid

The University has merit aid programs of scholarships and awards for students with superior academic credentials or talents. These programs are based entirely on merit, without regard to financial need. Renewal is dependent on annual reapplication by April 1 and satisfactory academic progress relevant to the specific award in at least 15 credit hours per semester. With the exception of the Valedictorian Award, merit scholarships cannot be combined.

*Presidential Academic and State Alumni Scholarships*—for incoming freshmen. Partial tuition scholarships are awarded to finalists and semifinalists in national academic competitions such as National Merit, National Hispanic Scholars, and National Achievement for Outstanding Negro Students. Partial tuition awards are also available to other outstanding students, including students admitted to the University Honors Program and Presidential Science Scholars in Chemistry and Physics. Members of Phi Theta Kappa or Alpha Beta Gamma who are transferring from community or junior colleges and have achieved grade-point averages of 3.7 and above in 56 transferrable hours will be considered for partial tuition awards. A GPA of 2.7 (B-), exclusive of courses not counted toward graduation, is required for renewal of the aforementioned awards. Merit scholarships are also available to students admitted to the seven-year integrated B.A./M.D. program; offering a unique fixed-tuition plan, this arrangement allows families to plan and finance their student's undergraduate and medical education. The integrated B.A./M.D. program requires a GPA of 3.0 for renewal.

*Presidential Arts Award*—partial tuition awards for incoming freshmen who have shown promise in the fine arts and in music, theatre, or dance. A GPA of 2.7 (B-) and the recommendation of the relevant department is required for renewal.

*Valedictorian Award*—\$2,500 scholarships are awarded to high school seniors who graduate first in their class and attend GW. This is a one time only award for the freshman year.



**Presidential Academic Scholarships**—\$5,000 awards (limit of \$2,500 per semester) are available to continuing students who have achieved a GPA of 3.7 (A -) after completing 30 or more credit hours at GW and who are not receiving another merit award.

**Awards for Phi Beta Kappa**—\$2,000 awards for the senior year are made to students who are elected to Phi Beta Kappa in their junior year and who are not receiving a Presidential Academic Scholarship.

**Elliott Engineering Honor Scholarships**—may be renewed by current recipients who maintain the required GPA (EHS, 3.0; EHHS, 3.3) in 15 credits per semester, provided the recipient is enrolled full time in an engineering curriculum. There is an option of an additional academic year immediately following graduation if the student is admitted to graduate study at the master's level.

### **Need-Based Aid**

The University offers extensive programs of scholarships, grants, loans, and employment based upon demonstrated need. The University participates in the Federal Perkins Loan, Federal Pell Grant, Federal Supplemental Educational Opportunity Grant, Federal Family Education Loans, and the Federal Work-Study program.

Applications and supporting credentials for financial aid must be filed by February 1 (incoming freshmen) and April 1 (transfers and continuing undergraduates) preceding the academic year of the award for the fall semester; and, if funds are available, by November 1 for the spring semester and by May 1 for the summer sessions. Only students who are enrolled in this University for at least 6 credit hours in the immediately preceding spring semester or who have applied for financial aid for the following fall semester are eligible for consideration for summer sessions financial aid. A student must reapply for all financial aid, including scholarships, each year; renewal is contingent upon funds being available when the student completes the application.

Complete information concerning financial assistance is contained in the student financial aid pamphlet, available at the Office of Student Financial Assistance.

### **University Scholarships**

Full- and partial-tuition scholarships begin in the fall semester and may be renewed through the senior year, provided the holder reapplies by the published deadlines, maintains a B - average or better, and continues to be in financial need.

#### **Sherman Page Allen Memorial Scholarship Fund**

##### **Alumni Scholarships**

American Association of Cost Engineers Scholarship

Mary J. Anderson Scholarship

D.F. and J.D. Antonelli Scholarship Fund

Athletic Scholarship Fund

Atlantic Research Corporation Scholarship

Byron Andrews Scholarship

Sigrid Weeks Benson Scholarship

Board of Trustees Scholarship

Henry N. Brawner, Jr., Foundation Scholarship Fund

A.D. Britt Scholarship Fund

Frederick Albert and Alma Hand Britten Scholarships

Mary Ellen Caplin Scholarship

Elsie M. Carper Undergraduate Scholarship Fund

Emma K. Carr Scholarships

Henry Harding Carter Scholarship

Maria M. Carter Scholarship  
Paul E. Casassa Memorial Foundation Scholarship  
James Edward Miller Chapman Educational Foundation Scholarship  
The Chesapeake and Potomac Telephone Company Scholarship  
Columbian Women Scholarship Funds  
    Victoria Briggs Scholarship Fund  
    Elizabeth V. Brown Scholarship Fund  
    Grace Ross Chamberlin Scholarship Fund  
    College Women's Scholarship Fund  
    Columbian Women Members' Scholarship Fund  
    Arline Hughes Dufour Scholarship Fund  
    Dr. Watson W. Eldridge, Jr. and John F. Eldridge Scholarship Fund  
    Founders of Columbian Women Scholarship Fund  
    Ross Lees Hardy Foundation Scholarship Fund  
    Lillian Young Herron Scholarship Fund  
    Nellie Maynard Knapp Scholarship Fund  
    Marcia B. Kraft Scholarship Fund  
    Janet McWilliams Scholarship Fund  
    Marie-Louise Ralph Turner Scholarship Fund  
Cora and John H. Davis Scholarship  
Isaac Davis Scholarship  
District of Columbia Daughters of the American Revolution Scholarship  
District of Columbia Institute of Certified Public Accountants Scholarship in  
    Accounting  
Estella Constance Drane Scholarship  
Henry Parsons Erwin Scholarship  
Robert Farnham Scholarship  
Federal Government Accountants Association—Washington, D.C., Chapter—  
    Scholarship in Accounting  
Esther Brigham Fisher Scholarship  
Dean James Harold Fox Scholarship  
Geico Achievement Award  
Louis E. Giles Memorial Scholarships  
GW Tennis Alumni Association Scholarship  
Gary C. and Leslie Granoff Scholarship Fund  
Mildred Green Memorial Scholarship Fund  
Gridiron Foundation of the Gridiron Club Scholarship  
Isadore and Bertha Gudelsky Family Scholarship  
Anna Spicker Hampel Scholarship  
Theo Campbell Hartman Scholarship  
Elma Lewis Harvey Scholarship  
Hazelton Scholarship  
George F. Henigan Scholarships in Debate  
George Hyman Construction Company Scholarships  
Albert A. and Esther C. Jones Scholarship Fund  
Allen M. Jones Scholarship Fund  
David B. and James L. Karrick, Jr., Scholarship Fund  
Samuel and Elizabeth Kay Scholarships  
Amos Kendall Scholarship  
L. Poe Leggett Memorial Scholarship Established by WRGW  
Thaddeus A. and Mary Jean Lindner Scholarship Fund  
Calvin D. Linton Endowment Scholarship Fund  
Mary and Daniel Loughran Scholarship  
Martha's Marathon Residence Hall Scholarship  
Marshall Memorial Scholarship Fund  
Maud E. McPherson Scholarship



Mensh Family Scholarship  
 A. Morehouse Scholarship  
 E. K. Morris Education Fund Scholarships  
 Helen Marie and Thomas E. Orr Scholarships  
 Henry and Caroline Orth Scholarship Fund  
 Thornton Owen Scholarship  
 Pan-Dodecanesian Association of America Scholarship  
 Hardy Pearce Scholarship Fund  
 James and Theodore Pedas Scholarship  
 Phi Delta Gamma Scholarships  
 Fred B. and Alma D. Pletcher Scholarship Fund  
 Levin M. Powell Scholarships  
 Jack B. Sacks Foundation, Inc., Scholarship  
 Henry Whitefield Samson Scholarship Fund  
 Scottish Rite of Freemasonry Scholarship Fund  
 Cecelia M. Sehart Scholarship Fund  
 Lula M. Shepard Scholarships  
 Mildred Shott Scholarship Fund  
 Sigma Delta Chi Foundation of Washington, D.C., Scholarships  
 Myrna Sislen Guitar Scholarship  
 Margaret Lucille Snoddy Scholarship  
 David Spencer Scholarship  
 George Steiner Scholarship in Music  
 Mary Lowell Stone Scholarship  
 Charles Clinton Swisher Scholarships  
 U.S. Office of Education Traineeships  
 University Award for Phi Beta Kappa  
 University Players Scholarship in Memory of L. Poe Leggette  
 William Walker Scholarship  
 Wanda Webb Memorial Scholarship  
 Abigail Ann Brown and Henry Kirk White Scholarship Fund  
 John Withington Scholarship  
 Women's Physical Education Alumnae Association Scholarship  
 William G. Woodford Scholarship  
 Ellen Woodhull Scholarship  
 Zonta Club Scholarship  
 Barbara Jackman Zuckert Scholarship Fund for Blind Part-Time Students

#### *Other Academic Awards and Grants*

Fannie Mae/H.D. Woodson High School Grant  
 George Washington University Grant  
 GW Educational Opportunity Program Tuition Grants  
 GW Residence Hall Award  
 Key Club of Walt Whitman High School, Bethesda, Md., Grant  
 Marriott Foundation Grant  
 The Washington Post/Eastern High School Incentive Scholarship Program  
 21st Century D.C. Scholars Program

#### **GW Family Tuition Discount Plan**

A student attending George Washington University as a full-time undergraduate who has a sibling also attending GW for the same academic year as a full-time undergraduate may qualify for a GW Family Grant amounting to one half of tuition for the second student. For further information on this program, write to the Office of Student Financial Assistance.

### Resident Assistantships

Available to seniors in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes salary and a furnished room for the academic year. All positions are part time, and staff members are required to enroll as full-time students in degree programs. Further information may be obtained from the Office of Residential Life.

### Loan Funds

The following loan funds are available to degree students. A separate application must be submitted for all loan programs. Applications for the Perkins Loan Program should be filed no later than February 1 (incoming freshmen) or April 1 (transfers and continuing undergraduate students) for the following academic year. Complete information is contained in the student financial aid pamphlet, which is available from the Office of Student Financial Assistance, George Washington University, Washington, D.C. 20052.

Federal Perkins Loan Program  
George F. Henigan Loan Fund  
Inner-City Student Loan Fund  
International Student Loan Fund  
Joanne Jacobs Student Loan Fund  
Jessie B. Martin Loan Fund  
Barney Plotnick, M.D., Student Loan Fund  
Hiram Miller Stout Memorial Loan Fund  
University Student Emergency Loan Fund  
Edmund W. Dreyfus Loan Fund  
Peter and Doris Firsht Loan Fund

**Federal Stafford Loans**—George Washington University is an eligible participant in the Stafford Loan Program. Freshmen may apply for a maximum of \$2,625 per year; sophomores, \$3,500; juniors and seniors, \$5,500 per year. Students who intend to use the loan for payment of tuition at registration should submit an application, as well as all required supporting documents, no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration). Summer loans require completion of the prior academic year's Financial Aid Form by March 1.

**Federal Parent Loan for Undergraduate Students/Supplemental Loans for Students**—George Washington University is also an eligible participant in the Parent Loan for Undergraduate Students Program (PLUS) and the Supplemental Loans for Students (SLS). The interest rate on the loans is variable, based on the interest rate on U.S. Treasury bills, to a maximum of 10% for PLUS and 11% for SLS. Repayment begins 60 days after the disbursement of the check. Parents of dependent students may apply for up to the cost of education less other aid per year for each student. Independent freshmen and sophomores may apply for up to \$4,000 per year on their own behalf, junior and seniors, \$5,000. Students who intend to use the loan for payment of tuition at registration should submit an application no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

### Student Employment

The University participates in the Federal Work-Study Program. Inquiries should be addressed to the Office of Student Financial Assistance. In addition, the Career Center maintains a registry of both full-time and part-time positions



available in the Washington area for undergraduate and graduate students. After registration, students may apply at the Career Center for interviews and referrals to positions for which they are qualified.

### **International Students**

Undergraduate international students with proven financial need who have completed one semester of full-time work (15 hours) at this University with a B - average are eligible to apply for the Board of Trustees Scholarships; those with a C average are eligible to apply for GW Grants. Aid is awarded in the spring for the following academic year. See instructions for applying for undergraduate financial aid, above.

Long-term loan funds for undergraduate and graduate international students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available sufficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September-May) was \$24,065 in 1992-1993 and will be substantially higher in 1993-1994; generally speaking, expenses for international students are about \$2,000 over the stated figure, which includes room and board, tuition, books, clothes, and incidental expenses, but not travel, holiday, or medical expenses.

### **Veterans Benefits**

The Veterans Benefits office assists students entitled to educational benefits as active-duty personnel, veterans, or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting applications to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and that includes other information of general interest.

## PRIZES

*Abdelfattah Abdalla Prize*—Awarded annually to a junior or senior in the Department of Electrical Engineering and Computer Science for scholarship and service.

*Accountancy Department Prize*—Awarded annually to a Bachelor of Accountancy Student for academic excellence.

*Morris M. Aein Memorial Prize*—Awarded to a deserving student for excellence in drawing.

*Alpha Chi Sigma Prize*—Awarded annually by the Alpha Pi Chapter to the student who has attained the highest academic record in courses in chemistry. The name and year of graduation of the student is inscribed on a bronze plaque. The winner must have had at least 16 hours in chemistry, including the final semester, at this University.

*American Chemical Society Prize*—Awarded to an undergraduate student who has completed the junior year and who has demonstrated excellence in analytic chemistry.

*American Institute of Chemists Prize*—A medal awarded annually to the graduating student majoring in chemistry who excels in scholarship, integrity, and leadership.

*Norman B. Ames Memorial Prize*—Awarded annually to a graduating senior in the School of Engineering and Applied Science who has made significant contributions to the School and the University.

*Department of Art Prizes*—Two prizes (one for a senior in art history and one for a senior in the fine arts) awarded annually to the most promising students, as determined by the departmental faculty.

*William C. Barbee Prize*—Awarded to a deserving student for excellence in sculpture and sculptural ceramics.

*Perry Botwin Prize*—Awarded annually to an outstanding senior in the program in special education of the School of Education and Human Development.

*The Walter G. Bryte, Jr., Achievement Award*—Provided by Walter G. Bryte, Jr., Colonel, U.S. Air Force (retired), first Professor of Air Science at George Washington University. The award is presented annually primarily to that undergraduate residence hall, secondarily to any other activity at the University, that has shown, under the leadership of its elected or designated head, the most improvement or excellence in its support of the principles and aims of the United States of America and George Washington University. The hall or other activity will be awarded a cash prize, and the name of its leader and the hall or activity will be engraved on a silver trophy.

*Buka Family Prize*—Provided by Ruth Buka in honor of her parents, Georg and Rosa Buka, and her sister, Hilde Buka-Lacour. It is awarded to the most outstanding student in the Department of Germanic Languages and Literatures.

*Byrne Thurtell Burns Memorial Prize*—Awarded to the senior majoring in chemistry who shows the greatest proficiency in organic chemistry, as evidenced by a comprehensive examination, and who possesses such qualifications of mind and character as to give promise of future achievement.

*Business Administration Prize*—Awarded annually by the business administration departments to the outstanding graduating senior in business administration on the basis of scholarship, leadership, and service to the University.

*Wilbur J. Carr Prize*—Established in 1962 by Edith K. Carr, former Trustee of the University, in memory of her distinguished husband, who was graduated from the School of Comparative Jurisprudence and Diplomacy in 1899. It is awarded annually to that student in the graduating class of the University who has demonstrated outstanding ability in the study of international affairs and



who has given evidence of possessing in marked degree the qualities that produce the good citizen and the dedicated public servant.

*Chemical Rubber Company Freshman Chemistry Achievement Prize*—A *Handbook of Chemistry and Physics* awarded annually to the freshman student who has demonstrated the greatest achievement in Chemistry 15-16.

*Chemical Society of Washington Prize*—Awarded to an outstanding undergraduate in the junior year who is majoring in chemistry.

*Astere E. Claeysens Prize*—Established in 1981 by the Trustees of the Bess and Arthur Dick Family Foundation. It is awarded for the best original work in playwriting by a student enrolled in the University.

*John Henry Cowles Prizes*—Two prizes, established by John H. Cowles, Grand Commander of the Supreme Council of Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Free-masonry, Southern Jurisdiction of the United States of America. Awarded upon graduation to the graduate or undergraduate student with the best overall scholastic achievement and leadership potential in the School of Business and Public Management and in the Elliott School of International Affairs.

*DeWitt Clinton Croissant Prize*—Awarded annually to the undergraduate student enrolled in a course in drama or active in University dramatics who submits to the English Department the best essay on drama or the theater.

*E.K. Cutter Prize*—Established by Marion Kendall Cutter "for excellence in the study of English." Awarded to the member of the graduating class whose record in English, combined with general excellence, shows the most marked aptitude for and attainment in English studies.

*Isaac Davis Prizes*—Established in 1847 and awarded annually to the three seniors who have made the greatest progress in public speaking while enrolled in the University. Awards are determined by a public-speaking contest in which the participants deliver original orations. Only members of the senior class of Columbian College who are candidates for the degree of Bachelor of Arts or Bachelor of Science are eligible to compete.

*Henry Grattan Doyle Memorial Prize*—Established in memory of Henry Grattan Doyle, a former Dean of Columbian College. Awarded annually to an outstanding senior for excellence in Spanish.

*Elliott School of International Affairs Alumni Prize*—May be awarded annually to a graduate of the Elliott School of International Affairs (graduate or undergraduate degree recipient) who, in the opinion of the Dean and the Faculty, deserves recognition for academic achievement and contribution to the life of the George Washington University and its programs and goals.

*George Ellowitz Prize in Engineering*—Awarded annually to a graduating senior in the School of Engineering and Applied Science who has demonstrated a broad interest in the humanities and social sciences.

*Elton Prize*—Established by the Reverend Romeo Elton, of Exeter, England, and awarded annually to the student with the highest average in the most advanced course in the Greek language and literature.

*Jesse Frederick Essary Prize in Journalism*—Established by Helen Essary Murphy and awarded annually to a student who has given promise of sound citizenship and who submits the best printed and published evidence of ability in "forthright reporting" and good journalistic writing in a student publication or elsewhere.

*Jessie Fant Evans Prize*—A bequest of Joshua Evans, Jr., in 1971, in recognition of his wife's distinguished record at and service to the University, on whose Board of Trustees she served as the first woman member. Awarded annually to an outstanding senior student in a contemporary history course.

*Joshua Evans III Prize in Political and Social Science*—A memorial prize "established by friends because of an outstanding life." Awarded annually to that

student in the graduating class "who has demonstrated his/her signal ability in the social and political sciences and who has given promise of the interpretation of that ability in good citizenship among his/her fellows."

**Willie E. Fitch Prize**—Established by James E. Fitch in memory of his son. Awarded annually to a senior student for the best examination in chemistry.

**Alfred Martin Freudenthal Prize**—Awarded annually to the senior in the School of Engineering and Applied Science who graduates with the highest scholastic standing.

**Charles E. Gauss Prize**—Established in honor of Charles E. Gauss, Elton Professor of Philosophy from 1945 to 1964. Awarded annually to a graduating senior for excellence in philosophy.

**Alice Douglas Goddard Prize**—A memorial established by Frederick Joseph Goddard, of Washington, D.C. Awarded annually to the senior student making the highest average in American literature.

**Edward Carrington Goddard Prize**—Established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Washington, D.C., in memory of Edward Carrington Goddard, class of 1881. Awarded to the junior or senior student making the highest average in French language and literature.

**Morgan Richardson Goddard Prize**—A memorial established by Mary Williamson Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of Washington, D.C. Awarded to the junior or senior student making the highest average in the following fields: business administration, economics, international business, or public accounting.

**Harmon Choral Prize**—Awarded annually for significant musical accomplishment and outstanding contribution to the choral program.

**Ching-Yao Hsieh Prize**—Two prizes awarded annually, one to an undergraduate and one to a graduate student in the Department of Economics.

**Gardiner G. Hubbard Memorial Prize in United States History**—Established by Gertrude M. Hubbard in memory of her husband and awarded annually to that member of the graduating class majoring in history who has maintained the highest standing in courses in United States history.

**Human Services Program Prize**—Awarded by the Department of Human Services to a graduating senior who best exemplifies the attributes of service to the profession and academic achievement while a student at the University.

**Cecille R. Hunt Prize**—Offered annually to deserving art students and every two or three years to participants in the University's Art Alumni Exhibition.

**International Business Prize**—Two prizes awarded annually by the School of Business and Public Management to students specializing in international business, one awarded to a graduating senior and one awarded to a graduate student.

**David Lloyd Kreeger Prizes in Art**—Eight prizes given by Mr. Kreeger, six in the fine arts and two in art history (including museology). Fine arts prizes are awarded to a senior or graduate student in painting, sculpture, printmaking, ceramics, photography, and visual communication. One prize in art history is awarded to a senior and one to a graduate student. Candidates for the prizes must submit original papers or works of art. Winners are selected by distinguished representatives of the field of art in the Washington, D.C., area.

**Minna Mirin Kullback Memorial Prize**—Established in 1968 by Solomon Kullback in memory of his wife. Awarded annually by a committee of faculty members of the Department of Statistics to a full-time undergraduate or graduate student majoring in statistics, who will have completed 18 credit hours of statistics courses by the end of the spring semester.

**John Francis Latimer Prize in Classics**—Established in 1973. Awarded to a graduating senior who has made the most outstanding record as a major in the Department of Classics.



**Martin Mahler Prize in Materials Testing**—Awarded to the upper-division or graduate student in engineering who submits the best reports on tests in the materials laboratory course, with preference given to prestressed concrete tests.

**Hilda Haves Manchester Prize in Sociology**—Established in honor of Hilda Haves Manchester, B.A. 1932, an outstanding student whose major field was sociology. Awarded annually by Columbian College to the senior student majoring in sociology who has the highest scholastic record.

**The Barry Manilow Endowed Prize in Music**—Established in 1983. Awarded annually to a student majoring in music. The award is made on the basis of academic performance and musical ability, as determined by a committee of faculty appointed by the chair of the Music Department.

**Vivian Nellis Memorial Prize**—Awarded to a student in the English Department who has shown special promise in the field of creative writing.

**Phi Delta Kappa Prize**—Awarded annually by the George Washington University Chapter to an outstanding senior in a teacher education program in the School of Education and Human Development.

**Phi Eta Sigma Prize**—A choice book selected from the field of the recipient's major, awarded annually by the George Washington University Chapter to the student attaining the highest scholastic average in the first full semester of work. The winner's name is engraved on a plaque in the Office of the Dean of Columbian College.

**Pi Lambda Theta Prize**—Awarded annually by Alpha Theta Chapter to an outstanding senior in a teacher education program in the School of Education and Human Development.

**Psi Chi Prizes**—Two prizes awarded annually by the George Washington University Chapter to the best undergraduate student in experimental psychology and to the M.A. degree candidate or second-year graduate student submitting the best thesis or research project in psychology.

**Ruggles Prize**—Established by Professor William Ruggles in 1859. Awarded annually to a candidate for a bachelor's degree for excellence in mathematics.

**Howard C. Sacks Prize**—Awarded to a student in political science who has demonstrated outstanding academic achievement in the study of Far Eastern affairs.

**Hermann and Johanna Richter Schoenfeld Prize**—Established in grateful appreciation of the inspired teaching and devotion to his students of Dr. Hermann Schoenfeld, who for more than 20 years until his death in 1926 headed the Department of German. Hermann Schoenfeld, Ph.D., LL.D., was widely recognized as a scholar of distinction whose presence on the faculty added prestige to the University. This prize is given annually to a member of the graduating class for excellence in historical and cultural phases of German studies.

**Julian H. Singman Prizes**—Two prizes awarded annually, one in design and one in aquarelle painting.

**Walton E. Smith Memorial Prize**—Awarded annually by the Department of Management Science to a graduating student for outstanding performance in the field of information systems technology. The award is given to a student who has demonstrated exceptional performance on the comprehensive examination, in course work, and in contributions to the program by other means.

**Staughton Prize**—Established by the Reverend Romeo Elton and awarded annually to the student making the best record in the most advanced courses in Latin language and literature.

**Alfred E. Steck Memorial Prize**—Awarded for proven excellence in the field of sculpture.

**James MacBride Sterrett, Jr., Prize**—Established in 1911 by Professor Sterrett in memory of his son. Awarded annually to the student who obtains the highest average in Physics 1 and 2.

**Charles Clinton Swisher Historical Club Prize**—Established in 1936 by the Charles Clinton Swisher Historical Club and augmented in 1941 by the bequest of Professor Swisher. Awarded annually to the student who submits the best essay covering some phase of medieval history.

**Tau Beta Pi Outstanding Sophomore Prize**—Awarded annually to the School of Engineering and Applied Science student who ranks first in his or her class at the completion of the sophomore year.

**Geza Teleki Prize**—Awarded for outstanding work in the geological sciences.

**The Wall Street Journal Leadership Prize**—Awarded annually to a graduating senior in the Bachelor of Business Administration program for outstanding academic performance and service to the University.

**Thomas F. Walsh Prize**—Established in 1901 and awarded annually to the student who submits the best essay in Irish history.

**Alexander Wilbourne Weddell Prize**—Established in 1923 by Virginia Chase Weddell in memory of her husband. Awarded annually to a degree candidate who writes the best essay on "the promotion of peace among the nations of the world." The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.



## UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the college, school, or division in which they are registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the faculty) for subsequent registration in the University.

### Registration

Information on registration procedures is stated in the *Schedule of Classes*, which is available in advance of each semester.

Registration in courses is open only to those persons formally admitted to the University by the appropriate admitting office, as well as those students in good standing who are continuing in an approved program of study.

No registration is accepted for less than a semester or one summer session.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the school in which they are registered in this University. Registration in more than one school of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until all financial obligations have been met.



### *Eligibility for Registration*

Registration for the following categories of campus students is held on the days of registration published in the *Schedule of Classes*. A student who is suspended or whose record is not clear for any reason is not eligible to register. Registration in a given course may be denied students in the Division of Continuing Education when space is needed for degree candidates.

**New Student**—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

**Readmitted Student**—A student previously registered in the University who was not registered on campus during the preceding semester must apply for and be granted readmission by the appropriate admitting office before being eligible for registration.

**Continuing Student**—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

### *Completion of Registration*

Registration is not complete until financial obligations have been fulfilled. Attendance in class is not permitted until registration has been completed.

### *Program Adjustment (Add/Drop)*

The program adjustment period begins the first day of classes. Program adjustment requires the approval of an advisor.

### *Registration for Consortium Courses*

Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office of the Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar.

### *Student Status*

For the purpose of defining student status, undergraduates taking 12 or more credit hours are considered to be full-time students. All other undergraduates are considered to be part time.

### *Attendance*

Students may attend only those classes for which they are registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

### *Scholarship Requirements*

Students who fail to maintain the scholarship requirements of the college, school, or division in which they are registered may be dismissed from the University.

### *Grades*

Grades are mailed to students through the Office of the Registrar at the close of each semester. They are not given out by instructors or released over the tele-

phone. The following grading system is used: A, Excellent; B, Good; C, Satisfactory; D, Low Pass; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal; P, Pass; NP, No Pass. Other grades that may be assigned are A-, B+, B-, C+, C-, D+, and D-. Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of D or better was received, unless required to do so by the department concerned. A written statement, indicating that the student is required to repeat the course, must be submitted to the student's dean by the appropriate department chair.

#### *Incomplete/Authorized Withdrawal*

When another grade has not been assigned, the symbol I (Incomplete), the symbol W (Authorized Withdrawal), or the symbol Z (Unauthorized Withdrawal) will be recorded. The symbol I indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required work of the course. At the option of the instructor, the grade of I may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change. The grade of Z is assigned when students are registered for a course that they have not attended and in which they have done no substantial graded work.

#### *Changing a Grade of Incomplete*

For information concerning changing a grade of Incomplete, consult the regulations of the college, school, or division concerned.

#### *The Grade-Point Average*

Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: A, 4.0; A-, 3.7; B+, 3.3; B, 3.0; B-, 2.7; C+, 2.3; C, 2.0; C-, 1.7; D+, 1.3; D, 1.0; D-, .7; F, 0, for each credit hour for which the student has registered in a degree program. Courses marked CR, I, IP, P, NP, W, or Z are not considered in determining the average, except that courses marked I will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

#### *Final Examinations*

Final examinations for undergraduate courses are scheduled by the Office of the Registrar.

#### *Academic Dishonesty*

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.



Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following officers: all department chairs, all academic deans, the Registrar, and the Vice President for Academic Affairs.

### **Student Conduct**

All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained from the Office of the Dean of Students or from the offices of the academic deans. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

### **Withdrawal**

Withdrawal from a course or from the University requires the permission of the dean of the college, school, or division in which the student is registered. A grade of W will be recorded on the student's academic record. Permission to withdraw from the University will not be granted a student who does not have a clear financial record (see *Payment of Fees*).

Each college, school, and division of the University sets deadline dates for each semester concerning withdrawal. Withdrawal between these dates and the end of the semester is permitted only in exceptional circumstances.

All charges for courses from which the student withdraws are subject to the refund policy listed under Fees and Financial Regulations. Unauthorized withdrawal will result in the recording of a grade of Z for the course or courses.

### **Changes in Program of Study**

*Changes Within a College, School, or Division*—A student may not substitute one course for another, drop courses (see *Withdrawal*, above), or change status from credit to audit or from audit to credit without the approval of the dean of the college, school, or division in which registered. Change from one section to another of the same course may be made with the approval of the dean and the department concerned. Change from one major field to another within the same college or school may be made with the approval of the dean.

*Transfer Within the University*—Application for transfer to another college, school, or division must be made to the appropriate admitting office on the form provided by the office concerned. Students transferring within the University are advised to study carefully the requirements listed below under Graduation Requirements and to note that unless otherwise specified, in all undergraduate divisions, 30 credit hours, including at least 12 credit hours in the major field, must be completed while registered in the school or college from which the degree is sought. Upon transfer the student should consult the dean concerned and understand clearly the requirements that must be fulfilled. A maximum of

45 credit hours earned in the Division of Continuing Education may be applied toward a bachelor's degree in the degree-granting schools of the University.

### **Credit**

Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the college, school, or division concerned.

**Auditing**—A person who has been admitted to the University may be registered, with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate.

### **Post-Admission Transfer Credit**

Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

### **Transcripts of Record**

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. Official transcripts (those bearing the seal of the University and signature of the Registrar) are not issued to students. They are sent, upon appropriate request, directly to other schools, employers, embassies, etc. In certain instances the Registrar may issue an official transcript to a student in a sealed envelope; such an arrangement must be made with the Registrar when requesting the transcript. A fee of \$3 is charged for each official transcript. Unofficial copies of transcripts are available to students, by request, at a nominal fee. Partial transcripts are not issued.

### **Continuous Enrollment**

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below) or be assigned by the dean to inactive status (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

### **Leave of Absence**

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

### **Inactive Status**

Under the regulations established by each school and college, a student may be considered in continuous pursuit of the degree while not enrolled in courses at the University when engaged in the following: cooperative engineering work



semester; study abroad program; attendance at another institution with prior approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete was received; or non-course instructional activities unique to the particular school or college.

Students must request to be enrolled in inactive status, in advance of the year or semester concerned, and be granted approval by their dean for the specific activity desired. This status is generally limited to one year; no fees are assessed students while in this status.

### **Graduation Requirements**

Degrees are conferred in January, May, and September.

To be recommended by the faculty for graduation a student must have met the admission requirements of the college or school in which registered; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree as stated in this bulletin; filed an application for graduation by the published deadline date; and be free from all indebtedness to the University. Enrollment is required for the semester or summer session at the close of which the degree is to be conferred.

An application for graduation form must be filed by the published deadline for the last semester or summer session of the senior or final year. In addition to the conferring of degrees at the annual commencement in May, degrees will be conferred on September 30 for summer graduates and on January 30 for fall graduates. Students who complete degree requirements at the end of the summer and fall are invited to participate in the annual commencement the following May.

**Participation in the Commencement Ceremony**—Once the application for graduation has been filed, students who have completed all work toward their degree, or who are six or fewer credit hours short of completion, are automatically allowed to participate in the commencement ceremony. Those who are short seven or more hours may petition their dean's office for permission to participate.

### **Honors**

Bachelor's degrees with honors are awarded to students whose academic records give evidence of particular merit. The student's grade-point average determines the level of honors as follows: *cum laude*, 3.4–3.59; *magna cum laude*, 3.6–3.79; *summa cum laude*, 3.8–4.0. The grade-point average includes all course work completed at GW and is not rounded off. To be eligible for an honors designation, a student must complete at least 60 hours of course work at GW.

The grade-point average is calculated by the Office of the Registrar, and the honors designation is entered on the transcript and diploma of those students who earn an honors designation. If Latin honors are entered in the commencement program, honors status will be determined on the basis of work completed by the end of the seventh term and entered only for those students who have completed seven-eighths of the credit hours required for the degree. Latin honors indicated on the diploma are calculated on the basis of all course work completed. The diploma and transcript are the official indication that a degree was conferred and Latin honors awarded.

### **Special Honors**

Special Honors may be awarded by the faculty to any member of the graduating class for outstanding achievement in the student's major field on recommendation of the major department. The student must fulfill all of the following requirements: (1) Candidacy for Special Honors must be approved by the faculty member representing the major department or field not later than the beginning

of the senior year. (2) Such other conditions as may be set at the time the candidacy is approved must be met. (3) At least one-half of the courses required for the degree must have been completed at GW. (4) The specific requirement of the college or school in which the student is registered must be fulfilled as follows: (a) Columbian College and Graduate School of Arts and Sciences or the Elliott School of International Affairs—grades of A or B in 50 percent of the courses taken at GW; (b) the School of Engineering and Applied Science, the School of Education and Human Development, or the School of Business and Public Management—a grade-point average of at least 3.0 on all course work taken at GW. Special honors awards may not necessarily appear on diplomas.

### **The Library**

All students registered in the University have the privilege of using the University's Gelman Library. Its stacks are open, and all students are welcome to browse. A card denoting approved enrollment for the current semester must be presented when books are borrowed for outside use.

The loan period for stack books is 21 days. Any book that circulates is subject to recall by the library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. Transcripts of grades are withheld until a student's library record is clear, with all borrowed books returned and any fines paid.

All students using the University's Gelman Library are expected to be familiar with its detailed regulations, available at any of the library's service desks.

### **Right to Dismiss Students**

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

### **Right to Change Rules**

The University reserves the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

### **Right to Make Changes in Programs**

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

### **University Policy on the Release of Student Information**

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except as provided by the Act and except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.



The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin; dates of attendance; school, college, or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

**Property Responsibility**

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Office.

**University Policy on Drugs**

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

## FEES AND FINANCIAL REGULATIONS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees and financial regulations were adopted for the academic year 1993-94. Information on tuition and fees for the summer is published in the Summer Sessions Announcement.

### Tuition Fees

For undergraduate study\* in Columbian College and Graduate School of Arts and Sciences, the School of Business and Public Management, the School of Education and Human Development, the School of Engineering and Applied Science, and the Elliott School of International Affairs: All full-time undergraduates will be charged \$16,398 for academic year 1993-94. Part-time and nondegree students will be charged \$550 per credit hour.

**University Fee** (charged all students registered on campus)—\$29.50 per credit hour, to a maximum of \$295 per semester.

**Additional Course Fees**—In certain courses additional fees, such as laboratory and material fees, are charged by semester as indicated in the course descriptions. If breakage of apparatus is in excess of the normal amount provided for in the laboratory fee, the student will be required to pay such additional charges as are determined by the department concerned.

**Residence Hall and Food Service Fees** (see page 259)

### Special Fees and Deposits (Nonrefundable)

Application fee (all degree candidates) . . . . .	\$45
Advance tuition deposit, charged each entering or readmitted full-time undergraduate . . . . .	200
Orientation fee, charged each entering full-time undergraduate . . . . .	125
Housing deposit, charged each applicant for residence hall space . . . . .	300
Late registration during the first week of the semester . . . . .	75
Late registration after the first week of the semester . . . . .	125
Cap and gown fee (charged all students who choose to participate in commencement exercises) . . . . .	50
Late-payment fee (see Payment of Fees, below) . . . . .	50
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for any reason . . . . .	25
Special Columbian College departmental examination to qualify for receiving credit (advanced standing), waiver of requirement, or both . . . . .	100
Waiver examination to qualify for advanced placement . . . . .	25
Engineers' Council fee (charged all SEAS students), per semester . . . . .	8
English test for international students (when required) . . . . .	15
Study abroad fee . . . . .	25

\*A full-time program is defined as 12-17 credit hours per semester; a part-time program is fewer than 12 credit hours per semester. Undergraduates taking more than 17 credit hours per semester will be charged at the rate of 1 credit hour (\$550) for each credit exceeding that limit. In the event that a student's program requires more than 17 hours per semester, there will not be an additional charge for the 18th hour. For purposes of financial classification, students who enter a degree program in the summer preceding an academic year are considered to have entered that academic year. (For example, a student who begins course work toward a degree in summer 1993 is an entering student in academic year 1993-94.)



Laboratory check-out fee, for failure to check out of chemistry laboratory by the deadline date set by the instructor (a student who drops a chemistry course before the end of the semester must check out of the laboratory at the next laboratory period). . . . .	10
Statement issued by the Department of Romance Languages and Literatures certifying the degree of oral and/or written fluency and command of the French, Italian, Portuguese, or Spanish languages . . . .	50
Transcript fee. . . . .	3
Replacement of lost or stolen picture identification card . . . . .	25
Replacement of diploma. . . . .	50

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the use of the University library; (2) the services of the Career Center; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified. These privileges terminate when the student withdraws or is dismissed from the University.

### Payment of Fees

When the student registers for courses to be taken in the forthcoming semester, a Schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 credit hours or more may use a deferred payment plan at the time of each registration, which permits payment of one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half by Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the first day of the semester to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to use deferred payment unless the total tuition and fee charges exceed the value of the tuition awards by \$3,000 or more. Under such circumstances the student may be permitted to pay one-half of the amount due at the time of registration and to defer the balance.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment in future semesters, and the Student Accounts Office will notify the registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within

15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

**GW Monthly Payment Plan**—The University's Monthly Payment Plan is available to all students. Upon receipt of the appropriate application, the University will establish an account and mail payment coupons and envelopes for use to ensure proper credit of payments. The plan covers an academic year (excluding summer sessions) and requires ten monthly payments, May through February. Payments must be received by the 10th of each month. If a decision is made after May to use this plan, all missed payments must be made to bring the account current to the time participation is initiated. There is no charge and no interest for using the plan if all payments are made as scheduled.

**Commercial Prepaid and Deferred Payment Plans**—Several commercial programs for parents who wish to pay for college on a monthly basis are available. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

Mellon Bank Edu-Check Plan, P.O. Box 8888, Wilmington, Del. 19899  
 Knight Insured Tuition Payment Plan, 855 Boylston Street, Boston, Mass. 02116  
 School-Chex, Irving Trust Company, 61 Broadway, New York, N.Y. 10007  
 Educational Loan Program, The Riggs National Bank, 1120 Vermont Ave., N.W., Washington, D.C. 20005  
 The Tuition Plan, Inc., 57 Regional Drive, Concord, N.H. 03301

### Withdrawals and Refunds

Applications for withdrawal from the University or from a course after the registration period must be made in writing to the dean of the college, school, or division and to the registrar. Notification to an instructor is not an acceptable notice (see Withdrawal under University Regulations). Financial aid recipients must notify the Office of Student Financial Assistance in writing. No refund of the tuition deposit required of entering students is granted.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. *Complete withdrawal from all courses (on-campus students):*

Withdrawal dated on or before the end of the first week of the semester . . . .	80%
Withdrawal dated on or before the end of the second week of the semester . .	60%
Withdrawal dated on or before the end of the third week of the semester . . .	40%
Withdrawal dated on or before the end of the fourth week of the semester . .	25%
Withdrawal dated after the fourth week of the semester . . . . .	None
2. *Partial withdrawal:* If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.
4. *Summer Sessions:* In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days following the scheduled registration day. No refund will be made for courses dropped thereafter.

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid; those students should check with the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require



that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

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## GRADUATE PROGRAMS

The George Washington University offers graduate programs in the following representative fields. Detailed information is available in the Graduate Programs Bulletin.

### Columbian College and Graduate School of Arts and Sciences

Administrative Sciences	Human Sciences
American Civilization	Legislative Affairs
American Literature	Mathematics
Anatomy	Mathematical Statistics
Anthropology	Microbiology
Applied Statistics	Museum Studies
Art History	Neuroscience
Art Therapy	Pharmacology
Biochemistry	Physics
Biological Sciences	Political Science
Chemistry	Psychology
Criminal Justice	Public Policy
Economics	Radiological Sciences
English Literature	Religion
Fine Arts	Sociology
Forensic Sciences	Speech-Language Pathology and Audiology
Genetics	Statistical Computing
Geobiology	Statistics
Geochemistry	Telecommunication
Geography	Theatre
Geology	Women's Studies
History	

### School of Engineering and Applied Science

Aeronautics, Astronautics, Space Systems, and Propulsion	Information Management
Automation and Robotics	Logistics Engineering
Communications	Manufacturing Management
Computer-Aided Design	Mathematical Optimization
Computer Science	Medical Engineering
Construction and Facilities Management	Operations Research
Electrical Engineering	Public Works Management
Engineering Management	Solid Mechanics and Materials Science
Environmental and Water Resource Engineering	Stochastic Modeling
Fluid Mechanics, Thermal Sciences, and Energy	Structural Engineering
Geotechnical Engineering	Systems Science, Networks, and Controls
	Telecommunications and Computers
	Transportation Management

### School of Education and Human Development

Counseling	Elementary Education
Curriculum and Instruction	Elementary/Secondary Administration
Education Policy Studies	Exercise Science
Education Technology Leadership	Higher Education

Human Resource Development  
International Education  
Museum Education  
Reading Progress Management

Secondary Education  
Special Education  
Supervision  
Tourism Administration

#### **School of Business and Public Management**

Accountancy  
Association Management  
Business Administration  
Health Services Administration

Information Systems Technology  
Public Administration  
Taxation

#### **Elliott School of International Affairs**

International Affairs  
East Asian Studies  
European Studies  
International Development Studies  
Latin American Studies

Russian and East European Studies  
Science, Technology, and Public  
Policy  
Security Policy Studies

#### **National Law Center**

The National Law Center, the oldest law school in the District of Columbia, has an enrollment of approximately 1,600 full- and part-time students. The purpose of the Law Center is to prepare men and women to meet the needs of society in many fields of law and to encourage scholarly research and writing in the law. The Law Center seeks to fulfill these objectives through a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors; an extensive clinical law program, in which students learn legal skills by actual practice; two law journals that specialize in public law and international law; trial practice; participation in the Van Vleck Appellate Case Club and several other moot court competitions; and a series of student professional co-curricular activities. The Law Center also offers a program of graduate legal education and a continuing legal education program for members of the bar. Further information is available in the National Law Center Bulletin.

Undergraduates are eligible to take courses in the National Law Center under the following conditions. Students must demonstrate that they are qualified to undertake the work of a given law course as well as the relevance of the course to their programs of study. Permission must be secured from the student's advisor, the dean of the school in which the student is enrolled, and the assistant dean for graduate programs of the National Law Center. Registration is approved on a space-available basis after all Law Center students have registered. Law courses are graded on a Pass/No Pass basis for undergraduates.

#### **School of Medicine and Health Sciences**

The School of Medicine and Health Sciences, the eleventh oldest medical school in the United States, provides education for medical students, physician assistants, nurse practitioners, and other health professionals. At the graduate level, the School offers the Master of Public Health and Master of Science in Health Sciences as well as the Doctor of Medicine degree program. The 600 medical students are a heterogeneous group representing a broad cross section of geographic, social, ethnic, and academic backgrounds. The faculty numbers more than 2,300, with 115 in the basic science disciplines. Some 75 basic science faculty and 550 clinical faculty have full-time appointments. The faculty includes voluntary faculty with active practices in the Washington area and individuals who serve on the staffs of the National Institutes of Health and other federal medical facilities; some are the physicians and scientists who guide the health policies of the nation. The city of Washington provides the medical



student with a unique opportunity to observe government agencies, legislative institutions, and private organizations that influence the planning of health care delivery in our society. Teaching facilities provide the full range of experiences necessary to prepare the primary-care physician, the clinical specialist, and the teacher-investigator. Further information is available in the School of Medicine and Health Sciences Bulletin.

The School of Medicine and Health Sciences participates in three joint programs leading to the Doctor of Medicine. See Columbian College and Graduate School of Arts and Sciences for the combined B.A./M.D. and the integrated B.A./M.D. programs. See the main entry on the School of Medicine and Health Sciences for the early selection program.



## **DEGREES OFFERED BY THE GEORGE WASHINGTON UNIVERSITY**

*Columbian College and Graduate School of Arts and Sciences:* Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

*School of Medicine and Health Sciences:* Associate in Science (A.S.), Bachelor of Science (B.S.), Master of Public Health (M.P.H.), Master of Science in Health Sciences (M.S.H.S.), and Doctor of Medicine (M.D.)

*National Law Center:* Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

*School of Engineering and Applied Science:* Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S. [C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

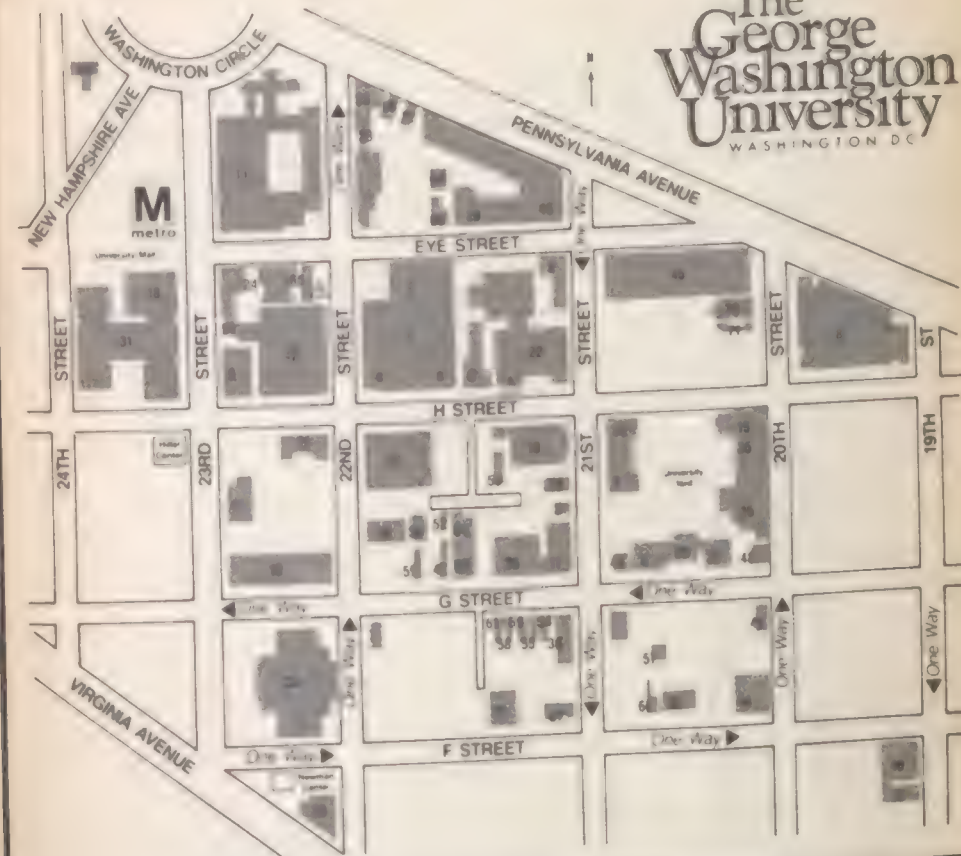
*School of Education and Human Development:* Bachelor of Human Services (B.Hm.Sr.), Bachelor of Science in Exercise and Sport Science (B.S. in Ex.Sp.), Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

*School of Business and Public Management:* Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.).

*Elliott School of International Affairs:* Bachelor of Arts (B.A.) and Master of Arts (M.A.)

# The George Washington University

WASHINGTON DC



## University Buildings\*

- 1 Academic Center 801 2nd St
- a Phillips Hall
- b Rouse Hall
- c Smith Hall of Art
- 2 Adams Hall 1000 Eye St
- 3 Kountze House 1715 2nd St
- 4 Bell Hall 1000 Eye St
- 5 Carver Hall 1000 Eye St
- 6 Crawford Hall 1715 2nd St
- 7 Davis-Hodgkins House 1715 2nd St
- 8 Edison Bldg 1900 Pennsylvania Ave
- 9 Everglades Hall 1000 Eye St
- 10 Fungus Hall 1000 Eye St
- 11 Government Hall 1715 2nd St
- 12 Guthrie Hall 1000 Eye St
- 13 Hospital, University 1000 Eye St
- 14 Kay Hall 1000 Eye St
- 15 Lerner Hall 1000 Eye St
- 23 Medical Faculty Associates and GW Health Plan 1000 Eye St
- 24 Mason Hall 1000 Eye St
- 25 Mitchell Hall 1000 Eye St
- 26 Monroe Hall 1000 Eye St
- 27 Munson Hall 1000 Eye St
- 28 Burgin Hall 1000 Eye St
- 29 Rice Hall 1000 Eye St
- 30 Riverside Towers Hall 1000 Eye St
- 31 Ross Hall 1000 Eye St
- 32 Samsom Hall 1000 Eye St
- 33 Smith Center 1000 Eye St
- 34 Staughton Hall 1000 Eye St
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- 36 Strong Hall 1000 Eye St
- 37 Stuart Hall 1000 Eye St
- 38 Student Health Service 1000 Eye St
- 39 Support Building 1000 Eye St
- 40 Thurston Hall 1000 Eye St
- 41 Sampson Hall of Engineering 1000 Eye St
- 42 University Garage 1000 Eye St
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- 45 2000 Pennsylvania Avenue
- 46 2100 Pennsylvania Avenue
- 47 Bldg. D, 2129 Eye St
- 48 Bldg. E, 2129 Eye St
- 49 Bldg. F, 2129 Eye St
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## Parking

Ambulatory Care Center (see #23)  
Marvin Center (see #24)  
University Garage (see #42)  
visitor parking entrance

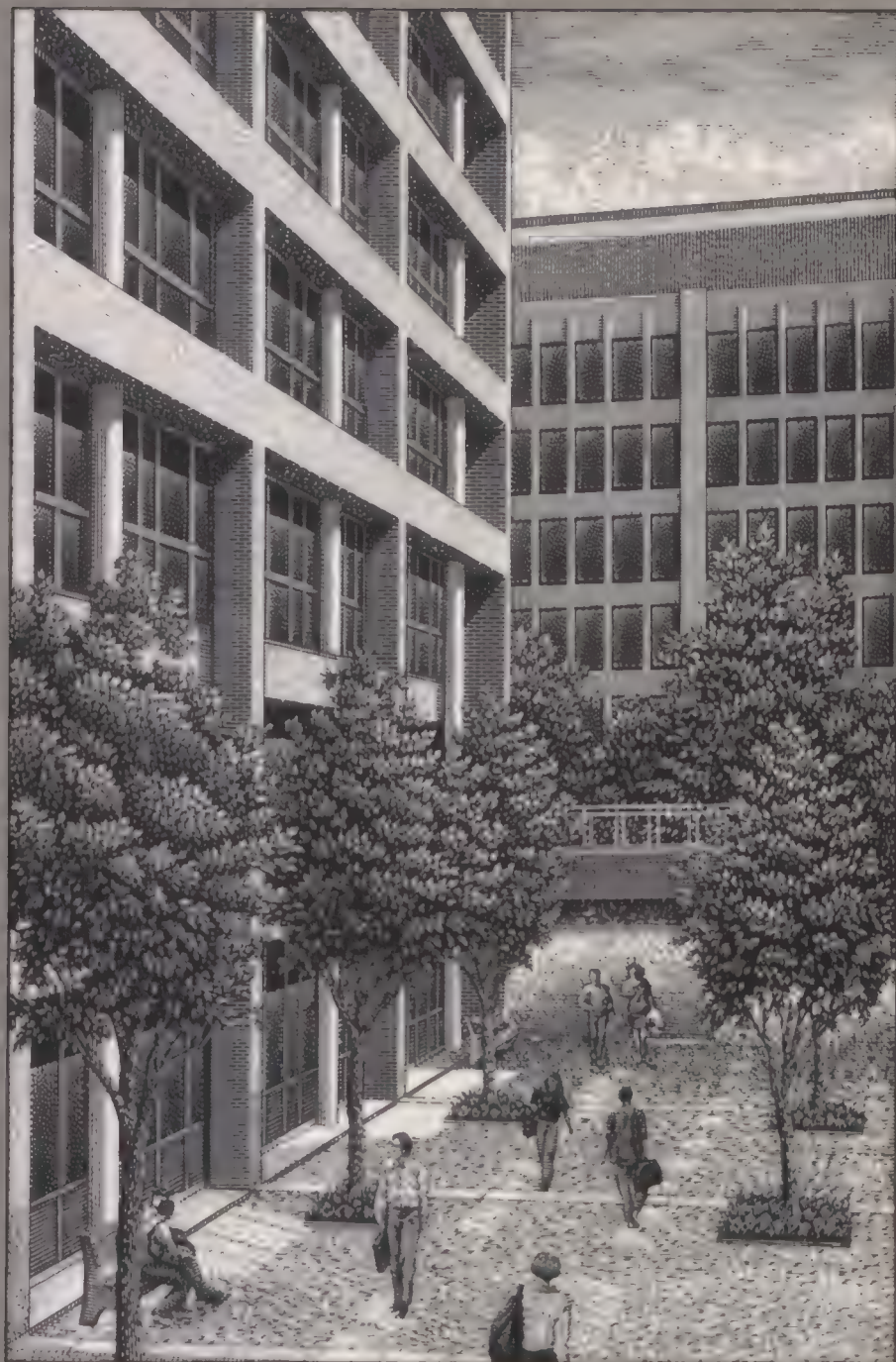
\*All addresses are in Northwest Washington

For assistance or information about university services and facilities call the GW Information Center (202) 994-GWGW  
Disabled individuals who need special information should call (202) 994-8250  
TDD voice



The  
George  
Washington  
University  
WASHINGTON, DC

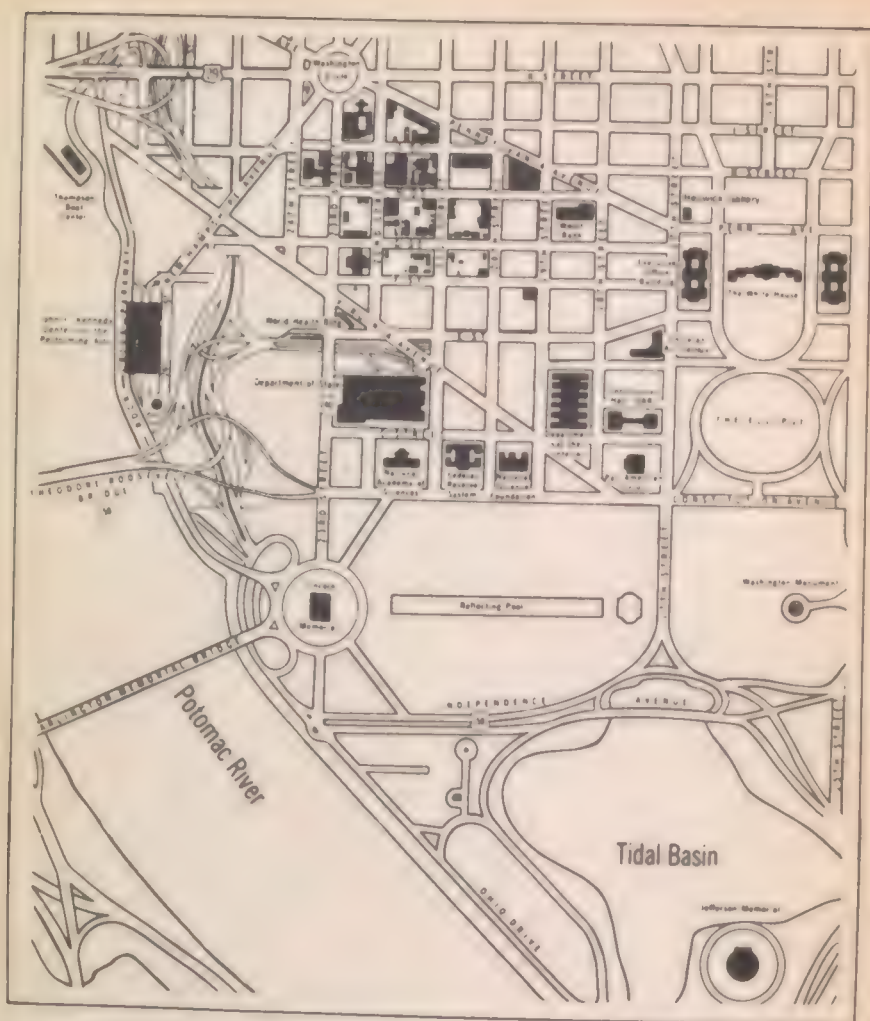
# THE GEORGE WASHINGTON UNIVERSITY BULLETIN



## GRADUATE PROGRAMS

1993-1994





THE GEORGE WASHINGTON UNIVERSITY CAMPUS/WASHINGTON, D.C.

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## GRADUATE PROGRAMS 1993-1994

**Columbian College and Graduate School of Arts and Sciences**

**School of Business and Public Management**

**School of Education and Human Development**

**School of Engineering and Applied Science**

**Elliott School of International Affairs**

Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Undergraduate Programs, the National Law Center, the School of Medicine and Health Sciences, or the Summer Sessions, please request the appropriate Bulletin.



Information in this Bulletin is generally accurate as of fall 1992. The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.

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<b>August 1993</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>December 1993</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>April 1994</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
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<b>November 1993</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	<b>March 1994</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	<b>July 1994</b> S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

## 1993 Fall Semester

August 26-27	Advising and testing for entering students
August 30	Classes begin
Aug. 30-Sept. 10	Late registration*
September 6	Labor Day (holiday)
September 10	Fall Convocation
October 1	Applications due for February graduation Applications due for November Master's Comprehensive Examinations in the Elliott School of International Affairs and the School of Business and Public Management
October 5	Applications due for November Master's Comprehensive Examinations and Doctoral Qualifying Examinations in the School of Engineering and Applied Science
October 11	Columbus Day (holiday)
October 29-30	Elliott School of International Affairs and School of Business and Public Management Master's Comprehensive Examinations
November 1	Applications due for spring semester financial aid Applications due for December Comprehensive Examinations in the School of Education and Human Development

\* Registration is by telephone only; consult the *Schedule of Classes*.



- November 8 Registration for spring semester classes begins\*
- November 12 Doctoral dissertations due from February candidates in the School of Education and Human Development
- November 22 Doctoral dissertations due from February candidates in the Columbian College and Graduate School of Arts and Sciences, the School of Engineering and Applied Science, and the School of Business and Public Management
- November 25-26 Thanksgiving holiday
- December 4 School of Education and Human Development Comprehensive Examinations
- December 10 Last day of fall semester classes
- December 13 Reading day
- December 14-22 Examination period
- December 15 Abstracts of dissertations due in Academic Publications for February doctoral candidates

### 1994 Spring Semester

- January 3 Master's theses due from February candidates  
All degree requirements to be completed and reported to the Columbian College and Graduate School of Arts and Sciences for February graduation
- January 7 Advising and testing for entering students
- January 10 Classes begin
- January 10-20 Late registration\*
- January 17 Martin Luther King Day (holiday)
- February 1 Applications due for May graduation
- February 7 Applications due for March Master's Comprehensive Examinations and Doctoral Qualifying Examinations in the School of Engineering and Applied Science
- February 16 Applications due for April Master's Comprehensive Examinations in the Elliott School of International Affairs and the School of Business and Public Management
- February 21 George Washington's birthday observed (holiday)
- March 1 Doctoral dissertations due from May candidates in the Columbian College and Graduate School of Arts and Sciences, the School of Engineering and Applied Science, and the School of Education and Human Development
- March 14 Applications due for April Comprehensive Examinations in the School of Education and Human Development
- March 14-18 Spring recess
- March 15 Abstracts of dissertations due in Academic Publications for May doctoral candidates
- March 16 Doctoral dissertations due from May candidates in the School of Business and Public Management
- April 1-2 Elliott School of International Affairs and School of Business and Public Management Master's Comprehensive Examinations
- April 4 Registration for fall semester classes begins\*
- April 9 School of Education and Human Development Comprehensive Examinations

\* Registration is by telephone only; consult the *Schedule of Classes*.

- April 11 Master's theses due from all May candidates except those in the Elliott School of International Affairs
- April 14 All degree requirements to be completed and reported to the Columbian College and Graduate School of Arts and Sciences for May graduation
- April 25 Last day of spring semester classes  
Master's theses due from May candidates in the Elliott School of International Affairs
- April 26-27 Reading period
- April 28-May 6 Examination period
- May 1 Deadline for submission of summer sessions financial aid applications
- May 8 Commencement
- June 1 Deadline for submission of 1994-95 graduate financial aid applications



## THE UNIVERSITY

### History

The George Washington University had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of 50 shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended a "fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of 46 acres between the present 14th and 15th Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between 13th and 15th Streets.

During the last half-century, the University's campus has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between 19th and 24th Streets, south of Pennsylvania Avenue. The area has many reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 I Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at 19th and I Streets, and Washington selected 23rd and E Streets as the site of the National University he hoped to see established.

### Location

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the National Academy of Sciences, the John F. Kennedy Center for the Performing Arts, and many other governmental and cultural institutions.

The Virginia campus, initiated for graduate studies, research projects, and professional development programs, is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

### **Purpose and Objectives**

The purpose of The George Washington University was to realize "the aspirations of Washington, Jefferson and Madison, for the erection of a university at the seat of the Federal Government." Over the years it has been the aim to develop the University ideal in the nation's capital with a view toward meeting the changing needs of society while continuing to pursue the traditional principles of learning and research.

The George Washington University is dedicated as an institution of higher learning to promote the general advancement of human knowledge and understanding and the development of every student to his or her highest potential so that each may make the maximum contribution to the improvement of the standards, mores, and scientific and cultural climate of all peoples.

In pursuit of excellence in education, the University dedicates itself to freedom of inquiry, respect for truth, and support for research. The University is committed to preserving a curriculum that embodies the content and spirit of the liberal arts and promotes academic specialization and professional education; fostering respect and communication among different cultures; and maintaining a continuing process of institutional self-assessment and adaptation to meet the rapidly changing needs of society.

The University recognizes its special opportunities in and obligations to one of the principal capitals of the world. It is a primary objective of the University to utilize its location in the nation's capital in continuing the development of a great nationally and internationally oriented university.

### **University Policy on Equal Opportunity**

George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to education programs and employment. The University is subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202)994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

### **The College, Schools, and Division**

George Washington University includes eight academic units, as follows:

*Columbian College and Graduate School of Arts and Sciences* offers undergraduate programs leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Music and graduate programs leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, Master of Science in Forensic Science, Master of Philosophy, and Doctor of Philosophy.

*The School of Medicine and Health Sciences* offers work leading to the degrees of Associate in Science, Bachelor of Science, Master of Public Health, Master of Science in Health Sciences, and Doctor of Medicine.

*The National Law Center* offers courses leading to the degrees of Juris Doctor, Master of Laws, and Doctor of Juridical Science and special programs in continuing legal education.



The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: civil engineering, computer engineering, computer science, electrical engineering, mechanical engineering, and systems analysis and engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Management, Engineer, Applied Scientist, and Doctor of Science.

The School of Education and Human Development offers undergraduate programs leading to the degrees of Bachelor of Human Services and Bachelor of Science in Exercise and Sport Science and graduate studies leading to the degrees of Master of Arts in Education and Human Development, Master of Arts in Teaching, Master of Education, Education Specialist, and Doctor of Education.

The School of Business and Public Management offers undergraduate programs leading to the degrees of Bachelor of Accountancy and Bachelor of Business Administration and graduate programs leading to the degrees of Master of Accountancy, Master of Association Management, Master of Business Administration, Master of Health Services Administration, Master of Public Administration, Master of Science in Information Systems Technology, Master of Taxation, Specialist in Health Services Administration, and Doctor of Philosophy.

The Elliott School of International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts.

The Division of Continuing Education assists in providing continuing education programs for adult students by administering or coordinating the graduate off-campus credit offerings of the college and schools of the University. Non-credit courses are also offered through the Division.

### Accreditation

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Board.

The National Law Center is a charter member of the Association of American Law Schools and is approved by the Section of Legal Education and Admissions to the Bar of the American Bar Association. The School of Medicine and Health Sciences has had continuous approval by its accrediting body, which is currently the Liaison Committee on Medical Education, sponsored jointly by the American Medical Association and the Association of American Medical Colleges. The Master of Public Health program has full accreditation from the Council on Education for Public Health. The Committee on Allied Health Education and Accreditation has accredited the undergraduate health sciences programs in nuclear medicine technology, radiation therapy technology, medical technology, physician assistant, and radiological sciences and administration. All undergraduate engineering curricula of the School of Engineering and Applied Science are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The computer science curriculum is accredited by the Computer Science Accreditation Commission of the Computing Sciences Accreditation Board. The School of Education and Human Development is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its eligible master's and doctoral degree programs; the master's programs in school and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs; the master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education. The School of Business and Public Management has maintained full membership in the Middle Atlantic

Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business; the Assembly accredited its undergraduate program in 1977 and its master's program in 1982. The programs in accountancy satisfy the educational requirements for the Certified Public Accountant and the Certified Management Accountant professional examinations. The program in health services administration is accredited by the Accrediting Commission on Education for Health Services Administration. The Master of Public Administration program is on the approved list of the National Association of Schools of Public Affairs and Administration. The Master of Association Management degree program is recognized by the American Society of Association Executives. The Department of Chemistry is on the approved list of the American Chemical Society. The Department of Music is an accredited member of the National Association of Schools of Music. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The graduate program in speech-language pathology and audiology is accredited by the Education and Training Board of the Boards of Examiners in Speech-Language Pathology and Audiology.

### **Consortium of Universities of the Washington Metropolitan Area**

George Washington University is a member of the Consortium of Universities of the Washington Metropolitan Area. Ten universities in the Washington area—American University, Catholic University of America, Gallaudet University, George Mason University, George Washington University, Georgetown University, Howard University, Marymount University, the University of the District of Columbia, and the University of Maryland—are associated in a Consortium through which they coordinate the use of their respective facilities; Mount Vernon College and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings the particular courses that best meet their needs. This privilege is subject to regulations of the school in which the student is enrolled. Participation is limited to degree candidates. Law and medical students are excluded from participation, except for LL.M. candidates. See the *Schedule of Classes* for specific regulations and information concerning registration for Consortium courses.

Registration forms and instructions are available from the registrar of the institution in which the student is enrolled. Students register and pay tuition at their own institutions for all Consortium courses; course fees are payable to the visited institutions.

### **The University Libraries**

The library collections of the University are housed in the Melvin Gelman Library (the general library of the University) and in the libraries of the National Law Center and the School of Medicine and Health Sciences.

These collections contain more than 1,600,000 volumes. University appropriations supplemented by endowments and gifts provide research materials in the social sciences, the humanities, engineering, and business. Gifts from many sources have enriched the collections, including a large National Endowment for the Humanities grant to strengthen the University's humanities holdings. The libraries hold over 18,000 serials.

Information concerning the use of the libraries may be obtained at library service desks. Individual and class instruction in the use of the library and orientation to library facilities are given by librarians upon request as well as through print, media, and computer-assisted instruction.



The libraries strive to fulfill the curricular and research needs and interests of the students. Through computerized searches of bibliographic databases, students identify and locate desired research materials not easily found through more traditional methods. The staff assists all members of the University in using the rich resources of the Washington area and the unusual opportunities they offer for extensive research.

Degree candidates at George Washington University may, upon application, be issued a Consortium library card that permits direct borrowing from the main campus libraries of six other academic institutions in the Washington area. Students may also obtain books and journal articles on interlibrary loan from other libraries in the city, throughout the United States, and in various other countries.

ALADIN, the computerized catalog of library materials, lists the holdings of the Gelman Library and the libraries of six other universities in the Washington area. It also provides on-line access to selected periodical indexes. The catalog can be accessed from terminals in the libraries or from personal computers on campus or elsewhere.

### **GW Television**

The main television resource of the University is GWTV, a state-of-the-art ITFS, multichannel broadcast facility. GWTV develops courses and programs in cooperation with academic departments for broadcast off campus; produces videotapes for class use and for continuing professional education; helps expand a program of national and international teleconferences; and manages the acquisition and maintenance of television equipment and facilities in various instructional units.

GWTV has the capability to receive from and transmit to any communications satellite. Video teleconference programs are delivered to a number of on-campus locations, where participants can interact by telephone link with the originating site.

### **Office of Alumni Relations**

The Office of Alumni Relations, in conjunction with the General Alumni Association, makes available to alumni and their families a program of services and educational and cultural events. Alumni are encouraged to inquire about available services and programs at the Office of Alumni Relations and to keep the Office informed of any changes in address or occupation.

### **General Alumni Association**

The objectives of this organization are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Membership in the Association is conveyed automatically to anyone who has been graduated from any school or division of the University. Anyone who has earned 15 credit hours or the equivalent at the University, who has left the University in good standing, and whose class has graduated is eligible for membership; in the case of the Division of Continuing Education students, however, only the "15 credit hours earned" requirement and not the "graduation of the class" requirement applies. Graduates of CCEW certificate programs are also eligible.

A Governing Board, composed of members representing the constituent alumni organizations, directs the activities of the Association. The voluntary leadership of the Association works closely with the staff of the Office of Alumni Relations in carrying out Association affairs. The Association may be contacted through the Office of Alumni Relations.

### The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Trustees who are GW alumni are indicated by an asterisk. Locations are indicated for trustees outside the Washington metropolitan area.

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Assistant Deans D.A. Rowley, A.D. Andrews

### **Introduction**

The George Washington University awarded its first Doctor of Philosophy degree in 1888, one of the first institutions in the United States to do so. In 1892, the School of Graduate Studies was instituted. A number of organizational entities followed and, in 1965, after several decades of growth in a number of departments, the Graduate School of Arts and Sciences was established. All undergraduate and graduate education and research programs in the arts and sciences were combined in 1992 under one administration with the formation of the Columbian College and Graduate School of Arts and Sciences.

All graduate programs in the arts and sciences, leading to the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, Master of Science in Forensic Science, Master of Philosophy, and Doctor of Philosophy, are administered by the Graduate School.

The faculty of the Graduate School sets requirements for admission, provides courses and programs of advanced study and research, and establishes academic standards for its degrees.

### **Admission Requirements**

Applicants must have academic backgrounds of excellence, usually with majors, or equivalent, in the fields in which they intend to study for advanced degrees. Normally, a B average (or equivalent) from an accredited college is required. With evidence of special promise, such as high Graduate Record Examination scores, an applicant whose academic record falls short of a B average may be accepted on a conditional basis. Meeting the minimum requirements does not assure automatic acceptance. The departments may, and often do, set higher admission standards. Moreover, the number of spaces available for new graduate students limits the number that can be accepted. Students who apply in their senior year must have completed their baccalaureate work before registration in the Graduate School and must present evidence of such completion. Applicants should be aware that graduate courses taken prior to admission while in nondegree status are not used in assessing admissibility to degree programs.

All applicants are required to submit scores on the GRE general test. In addition, some programs require scores on a GRE subject test (see the Departmental Requirements section of the application package). The applicant must have the Educational Testing Service send the required score reports directly to Columbian College and Graduate School of Arts and Sciences. GRE scores are valid for five years only.

*The following additional requirements pertain to all applicants from countries in which English is not an official language:*

1. Applicants who do not hold a degree from a regionally accredited U.S. institution of higher learning are required to submit scores from the Test of English as a Foreign Language (TOEFL). The Test of Written English (TWE) is also recommended. The recommended minimum TOEFL score for admission to a graduate degree program is 550.

2. Applicants for graduate teaching assistantships are required to submit scores on the TOEFL and the Test of Spoken English (TSE). To be considered for an assistantship, the applicant must have minimum scores of 570 on the TOEFL (55 in listening comprehension) and 250 on the TSE.



3. Applicants admitted as degree candidates will be required to take the English as a Foreign Language (EFL) Placement Test at The George Washington University before registering. (Those who score 600 or more on the TOEFL are exempted.) EFL course work may be required, depending on the applicant's performance on the placement test.

*Application for Admission*—Full information is available in the application packet provided by Columbian College and Graduate School of Arts and Sciences.

*Readmission*—A student who wishes to resume a graduate program that had been interrupted must file an application form and provide supporting documentation to be considered for readmission. Readmission is not guaranteed, and the application is subject to review by the department concerned and the dean. The student may be required to take qualifying examinations on the course work completed and additional course work. Application forms are available in the Graduate School Office.

### Regulations

See Fees and Financial Regulations; University Regulations.

In addition, the Graduate School publishes a Student Handbook each academic year which contains updated information on the School's policies, regulations, and other matters of concern to enrolled or admitted students. It is the responsibility of the student to be aware of the information contained in this *Bulletin* and the *Handbook*.

### Grades

Grades for graduate work are A, Excellent; B, Good; C, Minimum Pass; CR, Credit; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal, Z, Unauthorized Withdrawal.

The grade of I indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work for a course. The Incomplete must be made up before the lapse of one calendar year. An Incomplete for regular course work that is not changed within one calendar year remains permanently as a grade of I on the student's record. The grade of I cannot be removed by reregistering for the course here or by taking its equivalent elsewhere.

The grade of IP is given for all thesis and dissertation research courses until the thesis or dissertation is completed. Upon the satisfactory completion of the thesis or dissertation, the grade IP is changed to CR automatically. The grade of CR may be given for Advanced Reading and Research courses.

### Scholarship Requirements

Graduate students are required to maintain a minimum cumulative grade average of B (3.0) in all course work taken following admission to the Graduate School. Individual departments may require a higher average. The Department of English requires a 3.25 average. Only graduate course work taken at the University that forms part of the student's program of studies may be included in the cumulative grade average.

In the case of a student who receives a grade of F for a course in the program of studies, the Graduate School will require a written statement from the department justifying the student's continuance in the Graduate School and outlining the program to be followed. Continuation is contingent upon the dean's approval. When a grade of F is received for a course in the program of studies, the grade is included in the student's grade point average whether or not the course is repeated.

A student may repeat a course in which a grade of C or above was received only when permitted to do so by the department concerned, unless the course de-

scription states that the course may be repeated for credit. A written statement to this effect must be submitted for approval to the dean's office by the appropriate departmental advisor. It is then filed with the Registrar. If a course is repeated, the first grade received remains on the student's record and is included in the student's grade point average.

A graduate student may take an advanced undergraduate course (courses numbered 101-200) for graduate credit only upon the approval of the dean and the department at the time of registration. Such approval is granted only with the provision that the student complete additional work in order to receive graduate credit.

### **Program of Studies**

The program of studies is a formal statement of the requirements to be met in completing a specific degree program as well as the dates by which each requirement must be completed. The program of studies form is obtained from the Graduate School at the time of the first registration. It must be completed in consultation with the departmental advisor and submitted for approval to the Graduate School by the indicated date. A master's candidate's program of studies is due during the first semester of study, and a Ph.D. candidate's program of studies is due during the second semester of study. A program of studies may be revised, when necessary, by obtaining the approval of the departmental advisor and the dean. The revision must be filed in the Graduate School office. A completed course cannot be dropped from the program of studies unless its inclusion was due to an error in advising or an administrative error. Such a change in the program requires the approval of the dean.

It is especially important for those admitted with conditions to consult with their departmental advisor as early as possible regarding completion of the additional requirements specified in the letter of admission. The exact conditions for admission must be satisfied.

**Academic Work Load**—Full-time students register for 9 to 12 credit hours each semester; part-time students must register for 6 credit hours each semester. Students who work more than 20 hours per week must be part-time students. These requirements do not apply to students who have fewer than 9 credit hours (full time) or 6 credit hours (part time) remaining to complete their programs. No more than 15 credit hours may be taken during any one semester. Students who are employed more than 20 hours per week are expected to apply for part-time academic programs, and they will not be permitted to register for more than 6 credit hours in any semester.

### **Continuing Research**

All students must be continuously enrolled while working toward a degree, except during the summer sessions. Students who have completed all course work, special departmental requirements, thesis, and dissertation registration requirements and are within their program of studies deadline must register for continuing research each semester during the registration period. If continuous enrollment is not maintained, the student is dropped from the degree program unless a leave of absence is granted by the Graduate School.

### **Leave of Absence**

A student who, for personal reasons, is temporarily unable to continue the program of studies may request leave of absence for a specific period of time, not to exceed one calendar year during the total period of degree candidacy. If the request is approved, the student must register for leave of absence each semester. If a student fails to register, degree candidacy is terminated.



### Withdrawal

Students who intend to withdraw from the Graduate School should inform the School in writing. The last day for *complete* withdrawal without academic penalty is at the end of the eighth week of classes.

### Graduation Requirements

All students must file an Application for Graduation by the date indicated in the University Calendar for the semester or summer session in which they intend to graduate. Students must be registered in the Graduate School during the semester they plan to graduate. Degrees are conferred in February, May, and September. Students who have completed the requirements for a degree but have not yet been awarded the degree will be issued a letter to this effect upon request.

### Degrees

Listed below are the graduate degree programs of Columbian College and Graduate School of Arts and Sciences and the specific degrees offered, by field. The programs are directed by the departments concerned. Degree programs that bridge two or more departments are directed by committees composed of members of the departments concerned. For further information write to the dean or the chairman of the appropriate department. Students with special academic goals may pursue individualized programs of study toward the Master of Arts or Master of Science, subject to approval by the Committee on Individual Programs and the dean.

### Graduate Fields

The graduate course work offered in support of the degree programs in the following list is shown by department in this Bulletin.

Humanities	Degrees Offered	
American Civilization	M.A.	Ph.D.
American Literature	M.A.	Ph.D.
Art History	M.A.	Ph.D.
Dance	M.F.A.	
English Literature	M.A.	Ph.D.
Fine Arts	M.F.A.	
Ceramics		
Design		
Painting		
Photography		
Printmaking		
Sculpture		
Visual Communication		
Human Sciences		Ph.D.
Museum Studies		
Religion	M.A.	
Theatre	M.A.	
Women's Studies	M.F.A.	
	M.A.	
<b>Social and Behavioral Sciences</b>		
Administrative Sciences		
Human Resource Management	M.A.	
Management Information Systems	M.S.	
Organizational Management	M.A.	
Anthropology	M.A.	
Art Therapy	M.A.	
Criminal Justice	M.A.	
Economics	M.A.	Ph.D.

Geography	M.A.	
History	M.A.	Ph.D.
Legislative Affairs	M.A.	
Political Science	M.A.	Ph.D.
Psychology	M.A.	Ph.D.
Public Policy	M.A.	Ph.D.
Sociology	M.A.	
Speech-Language Pathology and Audiology	M.A.	
Telecommunication	M.A.	

#### Natural, Mathematical, and Biomedical Sciences

Anatomy		Ph.D.
Applied Mathematics	M.A., M.S.	
Applied Statistics	M.S.	
Biochemistry	M.S.	Ph.D.
Biological Sciences	M.S.	Ph.D.
Biology		
Botany		
Zoology		
Chemical Toxicology	M.S.	
Chemistry	M.S.	Ph.D.
Forensic Sciences	M.F.S., M.S.F.S.	
Genetics	M.S.	Ph.D.
Geobiology	M.S.	Ph.D.
Geochemistry	M.S.	
Geology	M.S.	Ph.D.
Industrial and Engineering Statistics	M.S.	
Mathematical Statistics	M.A.	
Mathematics	M.A.	Ph.D.
Microbiology	M.S.	Ph.D.
Neuroscience		Ph.D.
Pharmacology	M.S.	Ph.D.
Physics	M.A.	Ph.D.
Radiological Sciences		Ph.D.
Statistical Computing	M.S.	
Statistics		Ph.D.

#### Joint Master of Science-Doctor of Medicine Program

Students interested in the joint Master of Science and Doctor of Medicine program must meet the requirements for admission to the Graduate School and to the Doctor of Medicine degree program of the School of Medicine and Health Sciences.

The Master of Science program consists of a minimum of 30 credit hours. A maximum of 12 credit hours completed as a part of the Doctor of Medicine degree curriculum (and not already applied toward a bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining 18 credit hours, which in most programs includes a thesis, must be work in the basic medical sciences normally required for a Master of Science degree in the Graduate School.

#### Joint Master's-Juris Doctor Program

Students interested in working concurrently toward the Juris Doctor degree in the National Law Center and a master's degree in Columbian College and Graduate School of Arts and Sciences must meet the requirements for admission to both schools and all requirements in each degree program. It is possible for a student to complete work for both degree programs within four years.



### **Joint Doctor of Medicine-Doctor of Philosophy Program**

A joint program is available to qualified students who seek both the Doctor of Medicine and Doctor of Philosophy degrees. The requirements that must be fulfilled for both degrees are identical to those currently and separately established in the School of Medicine and Health Sciences and Columbian College and Graduate School of Arts and Sciences.

A student working toward these degrees may apply a maximum of 24 credit hours of approved course work in the School of Medicine and Health Sciences toward the minimum of 48 hours of course work required to qualify for the General or Cumulative Examination for doctoral candidacy. This course work is normally taken during the semesters that alternate with the medical program and in the years following the award of the M.D. degree. The student's research for the dissertation may begin concurrently with the final 24 credit hours of graduate course work leading to the General or Cumulative Examination. The estimated time for the completion of this dual program is six years.

In order to enter the joint program, a prospective student must first apply for and gain admission to both the Graduate School and the School of Medicine and Health Sciences separately through established procedures. Upon admission to both schools, the student may then apply for affiliation with the joint program. Work toward the Doctor of Philosophy degree is performed under the jurisdiction of a departmental doctoral committee.

### **Requirements for the Degrees**

#### **The Master's Programs**

Unless otherwise specified, the requirements listed below are applicable to candidates for the degrees of Master of Arts, Master of Fine Arts, Master of Forensic Sciences, Master of Science, and Master of Science in Forensic Science.

1. *General Requirements*—For a master's degree program including a thesis, the satisfactory completion of a minimum of 30 credit hours of approved graduate work, including 6 credit hours of thesis research, is required. For a master's degree program that does not include a thesis, the number of credit hours of approved graduate course work is determined by the department and normally consists of from 30 to 36 credit hours. The program without the thesis is not an individual student option and is not available in every department. Departments can and often do set requirements above the minimum required by the Graduate School.

Work taken to make up deficiencies is never counted as part of the requirements leading to a master's degree. Upon approval, up to one-half of the required graduate work may be taken in courses offered by the other affiliated institutions of the Consortium of Universities of the Washington Metropolitan Area, Inc., or by another degree-granting division of this University. If credit is transferred from another institution (see *Transfer of Credit*, below), the number of credit hours which may be taken at an affiliated Consortium institution is reduced by the number of hours accepted as transfer credit.

All master's degree candidates must complete degree requirements by the calendar date specified in the program of studies, which in no case will exceed four years. Extensions beyond the specified time period may be granted in exceptional circumstances, but the student will be required to register and pay for 6 credit hours of Reading and Research for audit each semester.

2. *Transfer of Credit*—A maximum of one-quarter of the credit hours of graduate course work required for a degree may be approved for transfer to the Graduate School from the Division of Continuing Education, another degree-granting division of this University, or another accredited college or university. For a transfer of credit to be approved, all of the following conditions must be met:

the course work must have been taken within the two years prior to admission to the Graduate School, it must be approved as part of the student's program of studies, it must not have been applied to the completion of requirements for another degree, it must be post-baccalaureate graduate-level course work, and the student must have received a grade of *B* or better in each course for which a transfer of credit is requested. This action must be requested in writing and approved by the departmental advisor and the dean. A transcript of the course work must be on file before the request can be considered.

3. *Special Program Requirements*—Master's degree candidates in some programs must demonstrate a reading knowledge of an appropriate foreign language. In other programs, students must demonstrate competence in quantitative methods, normally by passing prescribed courses in Statistics/Computer and Information Systems. Other programs have special requirements in other subjects. Courses taken at the undergraduate level to fulfill these requirements may not be counted in the number of graduate credit hours required for these programs. For further information on these and other regulations, consult the Student Handbook and the departments and program faculty concerned.

4. *The Thesis*—The main purposes of a master's thesis are to demonstrate the student's ability to make independent use of information and training and to furnish objective evidence of constructive powers in a chosen field. The student registers for six credit hours of thesis research and must complete the thesis no later than four calendar years after matriculation as a candidate for the master's degree. Registration for thesis research entitles the student to the advice and direction of the member of the faculty under whom the thesis is to be written. The thesis subject must be approved by the faculty member who will be directing the thesis. A thesis topic approval form must be submitted to the Graduate School upon registration for thesis research. The thesis—in its final form, with one copy and a certificate of approval signed by the thesis director and by at least one departmental reader—must be presented to the dean no later than the date announced in the University Calendar. All theses must meet the form, style, and other requirements set forth in a pamphlet, *Information Concerning Master's Theses and Doctoral Dissertations*, available in the Graduate School office.

5. *Master's Comprehensive Examination*—Most master's degree candidates must pass a Master's Comprehensive Examination in the major subject. Examinations are held on dates fixed by the departments, so that results can be filed in the Graduate School office no later than the day before the faculty meets to approve the list of graduates. The nature and form of the examination is the responsibility of the department or program.

A student who fails to pass the Master's Comprehensive Examination may, with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted.

### **The Doctor of Philosophy Program**

The minimum requirements for the doctoral program are as follows:

1. *General Requirements*—The program leading to the degree of Doctor of Philosophy requires the satisfactory completion of a minimum of 72 credit hours of approved graduate work for entering students whose highest earned degree is a baccalaureate. A minimum of 48 of these hours must be taken in preparation for the General Examination. Entering students whose highest earned degree is a master's degree are required to register for a minimum of 48 credit hours of approved graduate work, no fewer than 24 of which must be taken in preparation for the General Examination. While completing the dissertation portion of the program, the student must register for 12 to 24 credit hours of dissertation research, depending on the number of hours completed prior to the General Examination. The exact number of credit hours required for any part of the total



program is assigned by each department and may exceed the minimum required by the Graduate School.

Doctoral degree candidates have an overall eight-year time limit for completion of all degree requirements. Doctoral students in the first unit of their programs shall meet the calendar deadline for completing this unit as specified in the program of studies. Completion of the first unit includes satisfactory completion of course work, special program requirements, and the General Examination. Doctoral students in the second unit of their programs, i.e., dissertation research, shall have an approved topic on file in the Graduate School office by the date specified in the program of studies, which in no case will exceed two years from the completion date of the General Examination. All remaining doctoral degree requirements shall be completed by the date specified in the program of studies, which in no case will exceed five years from the completion date of the General Examination. If any of the deadlines specified above are not met, assuming academic approval for an extension, which may be granted in exceptional circumstances, the student must register and pay for 6 credit hours of Reading and Research for audit each semester. These hours will not be counted toward completion of the degree.

2. *Transfer of Credit*—Entering students who hold a master's degree relevant to the proposed doctoral field of study may request transfer of up to 24 hours of credit toward a doctoral degree for acceptable post-baccalaureate graduate work taken at the master's degree level at George Washington University or another accredited college or university. For those who do not hold the master's degree, a maximum of 24 hours of credit may be transferred, provided the conditions listed under The Master's Programs (Item 2) above are met.

3. *Special Program Requirements*—Certain doctoral programs require a reading knowledge of one or two appropriate foreign languages, or high proficiency in one language. Some require a reading knowledge of one language in addition to competence in quantitative or other subject matter; some require competence in other subject matters without a language requirement. Competence in quantitative methods is normally demonstrated by passing certain prescribed courses in Statistics/Computer and Information Systems. Courses taken at the undergraduate level to fulfill special program requirements may not be counted in the number of graduate credit hours required for the student's doctoral program, except that up to 6 hours of course work at the 100 level may be so counted, with the approval of the department and the dean, so long as the number of hours of dissertation credit in the student's program is 12 or more. For further information on these and other regulations, consult the Student Handbook and the departments and program faculty concerned.

4. *The General Examination*—Each student is required to complete the General Examination no later than the semester following the completion of course requirements. The General Examination is composed of a written examination five to six hours in length in each of the areas of study comprising the student's total program; the time permitted between each examination is determined by the administering department. Some departments permit one or two areas of study to be "written off"; that is, a special, shorter examination is given after a year of course work in the area. A cumulative examination system is in effect in the fields of chemistry and mathematics; students in these fields should consult the department for information.

A student who fails to pass any part of the General Examination may, in exceptional circumstances, and with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted. The student's degree candidacy will be terminated.

Satisfactory performance on the General Examination is required for admission to the second unit of the Doctor of Philosophy degree program, consisting of the dissertation and final examination. Admittance to the second unit is permit-

ted only if the student's General Examination committee finds that the student's performance on the examination and in course work gives a good indication of success in the second unit. Passing of the examination at the minimum level does not necessarily give this indication.

5. *The Degree of Master of Philosophy*—Upon departmental recommendation and approval of the dean, the degree of Master of Philosophy may be awarded to students who have successfully completed all requirements for the Doctor of Philosophy degree up to and including the General Examination. Not all departments recommend students for this degree.

6. *The Dissertation and Final Examination*—A dissertation is required of each doctoral candidate as evidence of ability to perform scholarly research and interpret its results. The candidate normally enrolls for Dissertation Research upon completion of Unit I; however, the candidate may register for up to 6 credit hours of Dissertation Research during Unit I. If the dissertation is not completed within five years from the date the General Examination is completed, the student will be required to request an extension to continue. If the extension is approved by the department and the dean, the student will be required to register for 6 credit hours of Reading and Research for audit and to retake the General Examination.

When the dissertation has been approved by the director, members of the Dissertation Research Committee, and the dean, the candidate takes the Final Examination, an oral examination that is open to the public. A committee of examiners (composed of Graduate School faculty and, when appropriate, outside scholars) conducts the examination. A sufficient number of copies of the dissertation must be provided by the candidate for the members of the Examination Committee. If the candidate passes, he or she is recommended by the Graduate School for the degree of Doctor of Philosophy.

No later than the date specified in the University Calendar, the candidate must submit to the dean the original and one copy of the dissertation and an abstract for inclusion in the Announcement of the Final Examination and for reproduction by University Microfilms, Inc.

Detailed information regarding regulations for the form and reproduction of the dissertation is available in the Graduate School office. The successful candidate for the doctorate is required, before receiving the degree, to pay a fee that is applied toward the expense of printing the Announcement of the Final Examination and the basic service rendered by University Microfilms, Inc.

### **Fellowships and Financial Aid**

Most departments offer graduate teaching assistantships and University fellowships, and research assistantships are available in some departments. Students should check with their department concerning the availability of assistantships and fellowships. Graduate teaching assistants and University Fellows are appointed by the dean of the Graduate School, based on department recommendations. Other kinds of sponsored and University awards are also available. Awards are based on academic excellence, and only full-time degree candidates in the Graduate School are eligible to be considered. Appointments are made on a year-to-year basis and are not automatically renewable.

Students applying for admission who also wish to apply for a fellowship should submit the fellowship application and a completed application for admission by February 15. Students currently enrolled in the Graduate School should submit the fellowship application by February 15 and should check with their departments concerning additional application requirements.

International students applying for teaching assistantships should refer to Financial Aid, International Students, for regulations governing the appointment of international graduate teaching assistants.

Forms are available at the Graduate Student Services Office and are included



in application for admission packets. Filing the fellowship application entitles the student to consideration for all awards available in the student's department.

Students who wish to apply for loans should indicate their intent to do so on the application for admission. Information concerning loans is contained in a booklet available from the University's Office of Student Financial Assistance.

### **Cooperative Programs**

The American Studies Program at George Washington University has made a cooperative arrangement with the American Studies Program of the Smithsonian Institution. Members of the staffs of the Smithsonian's American Studies Program, National Museum of American History, National Portrait Gallery, and National Collection of Fine Arts offer seminars and tutorial instruction in fields that provide students with an unusual opportunity to develop new dimensions in the discipline of American civilization. This program of study is open to students working toward the degrees of Master of Arts and Doctor of Philosophy and is intended to prepare them for research, teaching, and museum-related careers.

The Art Department of George Washington University has made arrangements with the Smithsonian Institution to offer graduate programs of study and research in museum studies leading to the degree of Master of Arts in the field of art history with a concentration in museum training. The Department has made similar arrangements with the Corcoran Gallery of Art, the Freer Gallery, the Hirshhorn Museum and Sculpture Garden, the Museum of African Art, the National Museum of American Art, the Phillips Collection, the Renwick Gallery, and the Textile Museum.

George Washington University, in cooperation with two other universities and the Folger Shakespeare Library, helped establish the Folger Institute for Renaissance and 18th-Century Studies as a cooperative venture in graduate studies in the humanities. Fifteen universities are now member institutions. Seminars (limited to 12 students each) are offered each semester under the direction of American and foreign scholars. The Folger Library forms the core of the Institute. All participants enrolled in the seminars are granted access to the collections of rare books, manuscripts, and reference materials of the Library. All registered students are eligible to apply for admission to one or more of the seminars, although priority in enrollment will be accorded graduate students working on dissertations and postdoctoral scholars from the sponsoring institutions. Further information, including a listing of seminar topics, is available at the Folger Shakespeare Library.

### **Center for Washington Area Studies**

The Center for Washington Area Studies serves as the focal point at the University for interdisciplinary work related to Washington and its regional context. Through teaching, advanced research, publications, and public events that include tours, exhibits, and conferences, the Center works to promote a better understanding and appreciation of the history, culture, literature, and public policies of the Washington region.

### **Off-Campus Degree Programs**

Columbian College and Graduate School of Arts and Sciences currently offers the following degree programs off campus: the Master of Arts and Master of Science in Administrative Sciences programs and the Master of Arts in the fields of Criminal Justice, Legislative Affairs, and Telecommunication. Not all of these programs may be available in any given year.

## **SCHOOL OF BUSINESS AND PUBLIC MANAGEMENT**

Dean F.D. Fowler

Associate Deans L. Graff, R.F. Dyer

### **Introduction**

Organized as the School of Government in 1928, the School of Business and Public Management has been responsible for over half a century for the professional development of individuals assuming leadership roles in society. The School comprises eight departments—Accountancy; Finance; Health Services Management and Policy; International Business; Management Science; Marketing, Logistics, and Operation Management; Public Administration; and Strategic Management and Public Policy. The use of a multidisciplinary approach in educational programming helps prepare both the generalist and specialist for professional careers in today's complex, organizational society.

### **Purposes**

The School of Business and Public Management is dedicated to academic excellence through the study, teaching, and research of management and policy in the public and private sectors, both within the United States and internationally.

Because of the growing interdependence of government and business, the School of Business and Public Management practices a multidisciplinary approach with flexibility in educational programming in the belief that such is essential to dealing with the complexities of today's organizational society. The School offers preparation of both the generalist and the specialist for professional careers and seeks to improve the quality and character of the individual as citizen, professional, and scholar as well.

More specifically, the purposes of the School are

1. To prepare its graduates for positions in the management of complex organizations.
2. To provide a broad and fundamental education as preparation for positions carrying management and leadership responsibilities.
3. To provide specialized educational opportunities as preparation for career positions in professional disciplines or functional areas.
4. To explore in all their forms, through education and research, the content, interactions, and interdependencies of disciplines and institutions in the public and private sectors, both nationally and internationally.
5. To make available the School's resources to business, health, government, community, and other organizations in both the metropolitan area and the larger community.
6. To foster understanding and advancement of knowledge and skills in the world community through research, education, and scholarly exchange with governments, institutions, and organizations engaged in the solution of international trade and investment problems and in the management of human settlements.

### **Academic Status**

The School of Business and Public Management has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. In 1968, the School became a member of the American Assembly of Collegiate Schools of Business, and the undergraduate and master's programs in business administration are accredited by the Assembly. The program in health services administration is accredited by the Accrediting Commission on Educa-



tion for Health Services Administration. The Master of Association Management degree program is recognized by the American Society of Association Executives. The School is a member of the National Association of Schools of Public Affairs and Administration, and its Master of Public Administration degree program is accredited by the NASPAA Commission on Peer Review and Accreditation.

### **Regulations**

See Fees and Financial Regulations; University Regulations.

### **Attendance**

A student may not attend classes until registration is completed. The student is held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor in charge before provision is made for the student to make up the work missed. A student suspended for any cause may not attend classes at GW during the period of suspension.

### **Withdrawal**

Withdrawal from a course or from the University without academic penalty is permitted during the first four weeks after registration for the fall or spring semester. Withdrawal after this period is permitted only in unusual circumstances and requires certification by the instructors of courses for which the student is registered that the student is doing passing work (see Withdrawal, under University Regulations).

### **Adding Courses**

Courses may not be added after the first two weeks of classes in any semester without the specific permission of the instructor.

### **Independent Study Plan**

A graduate student of demonstrated capacity, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific credit hours normally allowed when a course is taken on a class basis. A petition outlining the student's specific study plan must be submitted to the director of academic advising and student services prior to beginning any independent study.

### **Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the director of academic advising and student services, who may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the director.

### **Students from Other Schools Within the University**

Degree candidates from other schools of the University cannot register for more than 12 hours of credit from the Master of Accountancy, Master of Taxation, or Master of Business Administration degree programs.

### Common Body of Knowledge

Programs leading to the degrees of Master of Accountancy and Master of Business Administration include the equivalent of at least one year of work in the following areas:

1. A background of the concepts, processes, and institutions in the production and marketing of goods and services and the financing of the business enterprise or other forms of organization.
2. A background of the economic and legal environment as it pertains to profit and nonprofit organizations, along with ethical considerations and social and political influences as they affect such organizations.
3. A basic understanding of the concepts and applications of accounting, quantitative methods, and information systems.
4. A study of organization theory and behavior and interpersonal communications.
5. A study of administrative processes under conditions of uncertainty, including integrating analysis and policy determination at the overall management level.

### The Master's Degrees

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#### Entrance Requirements

To be considered for admission, applicants must present a bachelor's degree from a regionally accredited college or university. Admission to master's programs is highly competitive. Previous academic history, performance on the applicable entrance examination, letters of reference, motivation and aptitude to do graduate-level work, and professional experience are all taken into consideration.

Applicants for admission to programs leading to the degrees of Master of Accountancy, Master of Taxation, and Master of Business Administration must submit scores on the Graduate Management Admission Test; applicants for admission to the Master of Health Services Administration degree program must submit scores on the Graduate Management Admission Test or the Graduate Record Examination; applicants for admission to programs leading to the degree of Master of Public Administration and Master of Association Management must submit scores on the Graduate Record Examination. It is the responsibility of the applicant to make arrangements for the required test with the Educational Testing Service, Princeton, N.J. 08541. Correspondence concerning the Graduate Management Admission Test should be addressed to Box 966; concerning the Graduate Record Examination, to Box 955. Test scores that are more than five years old are not accepted for admissions review.

**Additional Requirements for International Students**—Students from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 550 is required for consideration for admission. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on TOEFL will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.

**Transfer Within the School**—Currently enrolled students wishing to transfer from one graduate degree program or field of instruction to another within the School must complete a new application for admission or a petition form through the Office of Graduate Admissions or Office of Academic Advising and Student



Services, respectively. Applicants for transfer are subject to requirements in effect at the time of transfer. In addition, students must submit all required credentials no later than the established completion dates for the term for which the transfer is requested. Students must be in good academic standing (3.0 grade-point average) for transfer consideration.

### **Readmission**

A student who withdraws, is suspended, or is otherwise absent without authorization from the University for one semester or more must make formal application for readmission and resubmit all supporting credentials including transcripts from previous schools attended, including George Washington University, and entrance examination scores. If readmitted, the student is subject to the rules and regulations in force at the time of return. If the student has attended one or more regionally accredited colleges or universities during absence from the University, complete official transcripts must be sent to the Office of Graduate Admissions from each institution attended.

The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of last registration at the University and has not since registered at another college or university.

### **General Requirements**

All students must complete the prescribed minimum number of credit hours of graduate course work. A maximum of one-quarter of the credit hours of graduate course work required beyond First-Level (Common Body of Knowledge) or other required prerequisite courses may be approved for transfer to the School of Business and Public Management from the Division of Continuing Education, another degree-granting division of this University, or another regionally accredited college or university under the following conditions: The course work must be approved as part of the student's program of studies; it must not have been applied to the completion of requirements for another degree; it must be at the graduate level, it must have been taken within the two years prior to acceptance into the program, and the student must have received a grade of B or better. This action must be approved by a petition to the director of academic advising and student services. A transcript and description of the course work must be on file before the petition can be considered. Should advanced standing be granted, the credit will count but not the grade. Only grades earned in courses in the Departments of Public Administration and Health Services Management and Policy while in nondegree status will be used in calculating the cumulative grade-point average.

Master's degrees are awarded by vote of the Faculty on completion of the required course work and completion of an acceptable thesis (if one is elected) in the chosen degree or field of instruction.

Courses numbered 101-200 may be counted toward the master's degree only when registration for graduate credit has been approved by petition at the time of registration by the director of academic advising and student services. Written approval from the course instructor is also required. No work counted toward a bachelor's degree may be counted toward a master's degree; however, a student who has completed the equivalent of a Common Body of Knowledge course with a grade of B or better as part of the bachelor's degree program may request by petition a waiver of that course at the master's level. A grade of B or better is required to waive remaining Common Body of Knowledge courses on the basis of equivalent graduate-level courses completed at GW or another regionally accredited college or university prior to admission to the program. All courses presented for waiver consideration must have been taken within five years prior to acceptance into the program.

A full-time student may register for a minimum of 9 to a maximum of 12 credit hours each semester and 6 credit hours each summer session. A graduate student who is employed more than 20 hours a week may not take more than 6 credit hours each semester and 3 credit hours each summer session. All work for a master's degree must be completed in five years.

Students who expect to continue studies for a doctoral degree after receiving the master's degree should ask for assistance in planning their programs of study.

No credit is granted for work done in absentia or without formal instruction, except for hospital residency, supervised field experience, independent study, and the thesis, which may be completed in absentia with the permission of the department, designated faculty advisor, or committee concerned.

### Scholarship Requirements

Grades for graduate work are A, Excellent; B, Good; C, Minimum Pass; F, Fail; I, Incomplete; IP, Progress; CR, Credit; W, Authorized Withdrawal; and Z, Unauthorized Withdrawal.

An average of B or better is required for the master's degree. The grade of C is not considered as failing but must be balanced by a grade of A in a graduate course of equal status. A minimum grade-point average of 3.0 is required for award of a graduate degree. All graduate courses and undergraduate courses taken for graduate credit after matriculation as a degree candidate (except those audited or taken for the grade of CR) will be used in the calculation of the grade-point average.

**Probation**—A student whose grade-point average falls below 3.0 after completing a minimum of 9 credit hours will be placed on probation. This probation extends through the period in which the student next attempts 12 credit hours of work, including prescribed courses. A student's program may be further restricted by the director of academic advising and student services, if deemed necessary. During this period the student's performance will be monitored to determine suitability for continued study. Please note that Incomplete grades are not allowed during the probation period. A student who is subject to probation for a second time at any point during the program is automatically suspended.

**Grade of F**—A master's degree candidate who receives a grade of F is required to present cause, for consideration by the director of academic administration, as to why continued study should be permitted. Once a grade of F is earned in a Common Body of Knowledge, required, or elective course, it remains a part of the students' permanent record and is calculated into the grade-point average.

A master's degree candidate given the grade of F in a required course, and permitted to continue in graduate studies, must repeat the course and achieve at least the grade of B. (Such a repeat does not expunge the grade of F, which remains part of the student's record.) Should this level of performance not be obtained, the student will be denied further registration as a degree candidate.

### Suspension

A graduate student who does not meet the conditions of probation (see above) will be suspended. A student who is suspended or withdraws under these conditions may apply for readmission after the lapse of one semester. An outstanding Incomplete grade at the time of suspension must be completed or will turn to an administrative F. To be readmitted the student must submit evidence that indicates academic success if readmitted. A student so readmitted will continue on academic probation and must achieve a minimum grade-point average of 3.50 in the next 12 semester hours of graduate study. Should the student fail to achieve this minimum grade-point average, a second suspension will result and subsequent readmission will be denied.



### **Incomplete/Withdrawal**

Conditions under which the grades of *I* (Incomplete), *W* (Authorized Withdrawal), or *Z* (Unauthorized Withdrawal) may be assigned are described under University Regulations.

The grade of *I* must be changed by a date agreed on by the instructor and the student but no later than the last day of the examination period for the fall or spring semester immediately following the semester or summer session in which the grade of *I* is assigned. An Incomplete that is not changed within this period automatically becomes an *F*. In cases of well-documented extenuating circumstances, an instructor and a student may jointly petition the director of academic advising and student services for additional time in which to complete the work of the course. Such petitions should be submitted within the same period. The grade of *I* cannot be changed by reregistering for the course here or by taking its equivalent elsewhere, and remains on the students' permanent record even after the course has been successfully completed.

### **Thesis**

Students contemplating doctoral study are strongly urged to include the thesis as an elective in their master's program. The thesis subject should be selected as early as possible to permit effective integration with the course work.

The subject must be approved by the professor in charge of the student's field. The thesis in its final form must have the approval of the professor in charge and must be presented to the dean by the student no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the semesters in which registered for thesis seminar (299) and/or thesis research (300), to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time is granted. The student must, however, be enrolled continuously in the program. If the preparation of the thesis extends more than three semesters beyond the date registered for thesis research, the student must register for the entire required hours of thesis again and pay additional tuition.

### **Master of Accountancy**

The Master of Accountancy degree is designed to prepare students for professional careers in accounting either in the public or private sector. A particular objective of the program is the student's attainment of professional certification. The Master of Accountancy is recognized as the necessary fifth year of education in a professional accounting program, and as such, it is superimposed on a Common Body of Knowledge in accounting and business subjects. The Common Body of Knowledge is ordinarily attained by the completion of a bachelor's degree in accounting or business from a regionally accredited institution of higher education.

The program consists of 60 credit hours of course work, of which 27 may be waived if comparable study has been completed prior to admission. Six semester hours of course work of the minimum program of 33 hours may be awarded as advanced standing.

Students should verify state regulations concerning the Certified Public Accountant Examination for the state in which they plan to practice.

The program of study consists of two levels.

**First Level (Common Body of Knowledge Courses)**—Accy 201, 202, 211, 297; Fina 220; MLOM 240; Econ 217; Mgt 201, 218, 270. This set of courses must be completed prior to enrollment in Second-Level courses, except Accy 297, which must be taken in the last semester of the program. All of these course require-

ments, except Accy 297, may be satisfied by evidence of successful completion of comparable work at other regionally accredited institutions. First-Level courses may not be taken to satisfy Second-Level requirements or electives.

**Second Level**—Accy 221, 225, 251, 261, 275, 282; one course chosen from Accy 262, 263, or 264; and three graduate-level courses chosen from accountancy with advisor approval. No more than three taxation courses may be included in the program.

### **Master of Association Management**

The Master of Association Management prepares students to undertake or advance in careers in association management. It is also for practitioners who already work with nonprofit associations of various kinds—trade, public interest, membership, and special interest associations; scientific, technical, and learned societies; trade unions; political action committees; religious and fraternal organizations; foundations; and local ad hoc groups. Substantive areas comprising the Master of Association Management program are marketing strategies and representation; comparative institutions; communications, media, and information systems; finance and accounting; analytical and research methods.

The 42-credit-hour program is interdisciplinary, consisting of a ten-course core, three other required courses, and an elective course.

#### **Required Courses**

Core courses: AM 270, 271, 272, 273 or 274, 275, 276, 277, 279; PAd 295, 296.

Any two of the following courses: PAd 212, 213, 215, 216, 242, 245.

Any one of the following courses: PAd 223, 224; Mgt 204, 210, 212, 213.

**Elective**—With the approval of the advisor, the student may satisfy this requirement by choosing any 3-credit graduate-level course either from the courses listed above or from other courses offered by the University.

### **Master of Business Administration**

The Master of Business Administration degree is designed to prepare students for careers in management in both the private and public sector. The program of study leading to the Master of Business Administration provides a basic foundation in the functions of business, the global environment in which it operates, and the analytical tools needed for intelligent decision making. The program provides in-depth study of one field of instruction and broad exposure to subjects and issues at the general management level.

The program consists of 60 credit hours of course work, of which 27 hours of first-level courses may be waived if comparable study has been completed at a regionally accredited college or university prior to admission. Thus the shortest possible program is 33 credit hours.

The program of study consists of two levels and contains four components.

**First Level (Common Body of Knowledge Courses)**—Econ 217–18; Accy 201; Mgt 201, 218, 270; Fina 220; MLOM 240; SMPP 201, 297. This set of courses must be completed prior to enrollment in second-level courses, except SMPP 297, *Strategy Formulation and Implementation*, which must be taken in the last semester of the program. All of these course requirements, except SMPP 297, may be satisfied by evidence of successful completion of comparable work at other regionally accredited institutions. Common Body of Knowledge courses not completed before the applicant matriculates in the School of Business and Public Management will be assigned in the letter of admission. First-level courses may not be taken to satisfy second-level requirements.

#### **Second Level**

1. **Five Breadth Courses**—Breadth courses provide exposure to a broad range of subjects intended to develop professional competence in general manage-



ment. In consultation with a faculty advisor, students select five courses from at least four fields outside the field of instruction. Students may design a program in consultation with their advisor that is tailored to individual career goals.

2. *Four Field of Instruction Courses*—This set of courses gives students depth of understanding in a selected field. Courses are selected in consultation with the faculty advisor and may be tailored to individual interests.

3. *One Elective Course*—Students may select any graduate-level course to satisfy this requirement after consultation and approval of the faculty advisor.

### **Fields of Instruction**

Students select a minimum of four courses from one of the following fields.

**Business Economics and Public Policy**—This field is directed toward understanding and analyzing the principal forces shaping the total business environment. Special attention is given to governmental policies and programs, social and cultural change, and the structure, evolution, and fluctuations of the economy. Students in this field take courses that survey the social, legal, ethical, political, and economic environment of business and the micro- and macro-economic foundations of government policies and of business response to these policies. Courses in this field are offered by the Department of Strategic Management and Public Policy.

**Finance and Investments**—This field prepares students for careers in finance and investments, providing a background in business budgeting, controllership, treasury, long-range planning, reporting, and financial management processes. Courses are designed to emphasize the planning, analysis, implementation, and controls necessary for making effective financial decisions. Instruction not only applies to manufacturing and trading enterprise but, in addition, includes preparation for careers in financial institutions and various financially oriented government careers.

**Human Resources Management**—This field is concerned with all aspects of the employment of human resources in business and public-sector organizations, both domestic and international. Career opportunities are open in domestic and international business organizations, hospitals, trade associations, research and educational institutions, and local, state, and federal government agencies. Courses encompass all phases of the recruitment, selection, employment, and development of people, compensation, industrial relations, unionism, collective bargaining, labor relations, and manpower utilization. Courses in this field are offered by the Department of Management Science.

**Information Systems Management**—This field is concerned with issues related to modern information and decision support systems in private and governmental organizations. Areas include systems analysis, user-system psychology, and trends in information systems. The program is designed for the professionals responsible for analyzing the information system needs of an organization and developing an implementation plan for meeting requirements that deals with the determination of the information needs and information flows within the organization. Courses in this field are offered by the Department of Management Science.

**International Business**—This field is designed to prepare students for careers in international banking, international and multinational corporations, and export trading companies; for careers in the federal government and in international agencies concerned with business, industry, and finance abroad; and for the commerce option of the Foreign Commercial Service. The program is also designed to prepare international students for careers in foreign and domestic firms within their own countries and for commercial officer positions within their governments.

**Logistics, Operations, and Materials Management**—This field addresses issues related to management and operating skills in materials acquisition, production, quality control, distribution, maintenance, and support functions throughout the life of the organization, system, or product. The program focuses on the integration of the managerial functions associated with transactions, technology, production, and services necessary to institutional success. Each student elects a study track (procurement and contracting, physical distribution, or product operations) in consultation with the advisor.

**Management Decision Making**—At all organizational levels, decision making is among the most important and most difficult responsibility of managers. This field prepares students for management careers in both private and public sectors. The program provides a foundation in the functional areas of business, the environment in which it operates, and the analytical and computer tools essential for decision making in today's complex environment. Courses emphasize effective evaluation and integration of qualitative as well as quantitative considerations in decision making. Courses in this field are offered by the Department of Management Science.

**Management of Science, Technology, and Innovation**—This field explores the many aspects of technology relating to and influencing research and development management, business, and public policy. The concentration has been designed to identify and study the problems associated with managing creative professional people in a dynamic technology. As a contextual area, the program stresses the need for students to undertake original and meaningful research involving political, economic, sociological, and operational problems encountered by management in industrial, governmental, and military research and development organizations. Courses in this field are offered by the Department of Management Science.

**Marketing**—This field is concerned with the development of professional marketing managers whose responsibilities may include planning and developing new products, services, and ideas; advertising, selling, and merchandising; and arranging distribution channel systems. Courses cover all aspects of the marketing management function. Specialized elective courses utilize the resources of the Washington metropolitan area.

**Organizational Behavior and Development**—This field is based on the application of theory and research in behavioral science to the task of building effective organizations. The program helps meet the need for professionals capable of designing, creating, and developing the necessary organizational systems appropriate to rapidly changing societies. Emphasis is on the interrelationships of motivation, leadership, problem solving, growth, and increased complexity of modern organizations and their effect upon the functions of organizational development. Courses in this field are offered by the Department of Management Science.

**Real Estate Development**—This field is designed to provide interdisciplinary and applied studies for students preparing for a career in real estate development. The field combines the fundamental economic principles and concepts that govern the real estate investment and development process with those that emphasize the analysis of specific projects, including site requirements and physical relationships, holding capacity, market conditions, financial feasibility and requirements, legal framework and constraints, and opportunities associated with the public sector and long-term community needs. Courses in this field are offered by the Department of Finance.

**Systems Theory and Cybernetics**—This field provides a broad, interdisciplinary perspective for dealing with complex management problems. Systems theory



identifies principles of organization common to physical, biological, and social systems, while cybernetics is defined as the science of communication and control in man, machine, and society. As the size and complexity of organizations increase and as social and technological change accelerates, this field has evolved as a way to understand the underlying principles of organization and management. The field is relevant to the operating manager or policymaker in the private or public sector. Courses in this field are offered by the Department of Management Science.

### **Master of Health Services Administration**

The Master of Health Services Administration degree program is designed to provide a core of generalist administrator courses for all students, coupled with specialized elective fields of instruction to meet the interests and career objectives of individual students.

The program of study consists of 54 credit hours of course work. In addition, 3 credit hours each in accountancy, economics, and statistics are prerequisite if comparable study has not been completed at a regionally accredited institution with a grade of B or better. The accountancy and economics courses must have been taken within five years of matriculation and the statistics course within two years. Once a student has matriculated, any unmet prerequisites must be completed at GW during the first 18 hours of course work; the accountancy and economics courses may be taken on a Pass/No Pass basis. Students are expected to have a working knowledge of a word-processing program and a spreadsheet program.

The generalist core includes the following nine courses: HSMP 202, 203, 206, 207, 210, 211, 212, 215, and 219. In addition, each student must take two advanced HSMP courses, one chosen from Group I and one from Group II, from among the following:

Group I (Policy/Planning)—HSMP 221, 223, 225, 226, 227, 252, 255.

Group II (Management)—HSMP 231, 233, 235, 236, 237, 238, 239.

During the last semester on campus, each student must also complete HSMP 245, which serves to integrate the concepts and methods of health services administration.

The fields of instruction each comprise 18 credit hours, including an experience-based learning component. In some fields of instruction, a one-year (9-credit-hour) administrative residency is mandatory. In other fields of instruction, the student may choose a 3-credit-hour internship and 6 credit hours of additional course work as a substitute for the 9-credit residency. Consequently, fields of instruction fall into one of two patterns:

**Residency Option**—Field of Instruction course work, 9 credits; administrative residency, 9 credits. Students will not be permitted to enter any administrative residency unless they have attained a 3.0 grade-point average with no grades of I.

**Internship Option**—Field of Instruction course work, 15 credits; administrative internship, 3 credits.

Courses comprising the field of instruction may be taken in the Health Services Management and Policy Department or other departments in the School of Business and Public Management, the University, or the Consortium of Universities. Each student develops a set of conceptually related courses suitable for the field of instruction and individual career objectives. The choice of courses must be approved by the faculty advisor and the department(s) offering courses.

This curriculum structure gives students an unusual opportunity to develop academic programs particularly suited to their needs. The core courses and the two advanced HSMP courses provide students with generalist administrative competence; the nine fields of instruction offer a wide choice of areas in which to develop special expertise. A 9-credit administrative residency is required in the fields of management of acute-care hospitals, management of long-term care

services, and management of ambulatory health services. In all other fields, students may choose the amount of experiential learning they wish to include in their programs, which can affect the number of months required to complete the program; that is, for a full-time student the residency option will require 28 months, while the internship option will require 20 months.

### Fields of Instruction

**Management of Acute-Care Hospitals**—This field of instruction is designed to provide an understanding of the organization, management, and interrelationships of hospital clinical, support, and administrative functions, and analysis of systems and procedures used to provide short-term inpatient services. Students are also provided with a managerial base in the areas of health services policy-making, regulation, and legislation.

**Management of Long-Term Care Services**—This field deals with medical and support services required by those who cannot function independently. These services are provided in nursing facilities, rehabilitation or psychiatric hospitals, hospitals or homes for the mentally retarded and developmentally disabled, chronic care and geriatric centers, and the client's home. The field also provides a management base in health services planning, policy-making, regulation, and legislation.

**Management of Ambulatory Health Services**—This field addresses the management of the delivery of health and medical services to individuals who do not require the constant supervision associated with inpatient care. Instruction focuses on the management of services in organizational settings in which individuals are engaged in delivering ambulatory care as a service offered by a formal organization. Ambulatory services managers also work in the areas of health services planning, policy-making, regulation, and legislation.

**Health Information Systems**—This field is designed to provide an understanding of information systems as they are used in the administration of health services. The concepts of information and computer systems are emphasized. Examples of the areas of application are medical records, program evaluation, community/national health statistics, financial management assessment, and productivity control.

**Health Services Financial Management**—This field responds to a demand for a thorough understanding by the administrator of financial management in health institutions. The instruction includes managerial accounting, cost analysis, financial decision making, capital formation, and investment analysis, with specific adaptation to unique problems within the health care field.

**Health Services Materials Management**—This field explores the management of physical resources in health service institutions. The instruction focuses on the purchase and management of supplies and equipment, inventory management, contracting, cost allocation, plant operations, and facilities maintenance.

**Health Services Policy**—This field is intended to meet the growing demand for specialists in health policy analysis and development. The curriculum provides training in basic and advanced policy analysis skills and the application of those techniques to practical health care policy-making situations. Students may pursue more general public policy courses in other departments as electives. The program includes at least one three-credit internship in a health policy position.

**Health Services Planning and Marketing**—This field is designed for those who wish to focus on the planning and marketing of health care services. Planning and marketing activities are relevant to large and small organizations in both the



public and private sectors. The functions of marketing apply to products, services, and ideas (social marketing). The focus of planning activities may be strategic, operational (new service development) or functional (human resources planning).

**Health Services and Operations Research**—This field deals with the application of research techniques and methodologies to the delineation of policy issues and the generation of solutions to problems in the organization, delivery, and financing of health services. Operations research is the application of mathematical techniques such as linear and nonlinear programming, queuing models, and simulation to develop solutions for operating and policy problems.

**Human Resources Management**—This field covers resources planning, allocation, utilization, and development and evaluation of health services personnel. Included are the various personnel functions, the development of personnel policies and procedures, employee and labor relations, and collective bargaining.

### **Master of Public Administration**

The Master of Public Administration degree program prepares students for professional careers not only in the public service (federal, state, and local) but also in organizations that require a knowledge of public policy and administration, such as public interest groups and research institutes. The 42-credit-hour program, outlined below, is intended to provide both a generic core for all students and specialized elective fields tailored to the interests and career objectives of each individual student. The curriculum provides graduate instruction in all areas recommended by the Guidelines and Standards for Professional Master's Degree Programs issued by the National Association of Schools of Public Affairs and Administration.

All students are required to complete an eight-course (24-credit-hour) core, which includes courses in public administration and management, public expenditure analysis, public policy, organization theory, human behavior in organizations, and research methods; at the end of the program, students are required to take PAD 289, which serves to integrate the diverse perspectives in public administration.

Each student selects, in addition, an elective field designed to provide a deeper and broader knowledge in a field of particular interest. The elective fields generally require a four-course sequence. With the approval of a faculty advisor, the student may design a special field if none of the fields offered matches individual learning and career objectives.

Students who lack substantial knowledge of the structure and functioning of government are strongly encouraged to take one of two courses in American administrative institutions: PAD 213, *Administration in the Federal Government*, or PAD 242, *Administration of State and Local Governments*. The remainder of the program consists of two elective courses chosen by the student with the advisor's approval. The electives may be taken in any related program or discipline.

Because public service requires a wide variety of expertise, students with all undergraduate degree backgrounds are considered for admission. There are no specific course prerequisites.

### **Required Courses**

**Core Courses:** PAD 205, 295, 296, 261; Mgt 210 or PAD 221; PAD 252, 289, 213 or 245.

**Elective Field**—four courses (see below)

*American Administrative Institutions:* Either PAd 213 or 242 is recommended as an introductory course. In some of the elective fields, either course may be counted as 3 of the 12 required credit hours.

#### *Two Elective Courses*

#### **Elective Fields**

The nine elective fields offered within the Department of Public Administration are described below. Four courses are required for each field. In addition to the fields listed below, students may elect such other standard four-course fields as Business Economics and Public Policy, Organizational Behavior and Development, Information Systems Management, International Business, and Management Decision Making. Students may also take an approved four-course sequence in the Department of Health Services Management and Policy. Moreover, a special field may be constructed, tailored to the student's academic interests and career objectives. To take a special field, the student writes a brief justification, specifying the courses to be taken, and submits it by petition through the faculty advisor.

**Budget and Public Finance**—This field covers the processes and institutions involved in budgeting, including the practical requirements of financial management; addresses issues of intergovernmental finance in a federal system; and imparts knowledge of alternative methods for allocating scarce public resources.

**Executive, Legislative, and Regulatory Management**—This field offers students the opportunity to develop an expertise in the management of federal government. With focus on the practical functions of public management, the field addresses the workings of the executive and legislative branches, emphasizing the regulatory process, the civil service, administrative law, and congressional oversight.

**Management of National Resources**—This field is designed to provide advanced course work exclusively to senior military and civilian officers at the Industrial College of the Armed Forces. The field prepares these officers for assignments that will require them to work closely with the private and public sectors in national resources management in time of war, and it prepares them for professional careers in the public sector.

**Managing in Public Organizations**—This field gives primary attention to the managerial processes by which organizations are structured and their work undertaken. It includes courses in organizational theory and large organizations but is also concerned with the management of governmental activities.

**Managing State and Local Governments**—This field deals with a range of federal, state, and local problems and issues, including alternative governmental structures and assignments of functions, sources of revenues and expenditure patterns, intergovernmental relations and management concerns, local government financing, and the formulation and analysis of urban policies.

**Policy Analysis and Evaluation**—The policy field is designed for those who wish to focus on the processes of public decision making and develop abilities to analyze and evaluate those processes.

**Procurement and Contracting**—This field covers the many activities of government performed under contractual arrangements. Procurement action is often subject to unique practices and regulations and requires the acquisition of specialized knowledge and skills in the processes of procurement and contracting. This elective field is offered jointly with the Department of Marketing, Logistics, and Operations Management.



**Public Human Resources Administration and Manpower**—This field addresses the traditional concerns in public administration with personnel, the staffing function of public organizations, and labor relations in the public sector. Courses are also offered in manpower development and the use of human resources.

**Telecommunications Management**—This field is designed for public managers who need to understand the various capabilities of telecommunications to organize and utilize information within an organization, the policy issues involved in the regulation of telecommunications, and the terminology and structures of telecommunication systems.

### **Internships**

Students with little or no professional experience are strongly encouraged to take an internship during the degree program. There are many opportunities in the Washington area for intern experiences in federal agencies, county and city government agencies, and the quasi-public sector. The Department assists students in securing appropriate internships; students are also encouraged to find internships on their own initiative. A substantial effort is made to relate the intern experience to the student's academic program. Internships may be paid or unpaid and may be taken for credit or not for credit. To receive academic credit, students must have completed 9 credit hours in the degree program. In general, internships for credit involve 15–20 hours of work per week for 14 weeks.

### **Master of Science in Information Systems Technology**

The Master of Science in Information Systems Technology is designed to provide students depth of understanding in a selected major field. The program offers three major fields: (1) information systems development, (2) applied artificial intelligence and expert systems, and (3) information systems project management.

The program consists of 51 to 54 credit hours of course work, of which up to 21 may be waived based on a student's prior background.

The program consists of the following requirements:

1. Twenty-one credit hours of prerequisite courses in areas such as programming languages, assembly language programming, computer systems architecture, data structures, systems analysis, mathematics, operating systems, data communications, and database systems. Of these 21 credit hours, 3 hours must be in systems analysis and at least 6 hours must be in computer programming.
2. Thirty credit hours of major field and other related courses.
  - (a) Information systems development—Mgt 280, 282, 283, 284, 285, 286, 287, 288, and two 3-credit elective courses.
  - (b) Applied artificial intelligence and expert systems—Mgt 280, 281, 283, 284, 285, 288, 291, 292; MLOM 255; and a 3-credit elective course.
  - (c) Information systems project management—Mgt 210, 215, 224, 230, 231, 280, 282, 284, 287, 288; and one other course selected with advisor approval.
3. Successful completion of a capstone project concurrent with Mgt 287 in the information systems development and information systems project management fields or Mgt 292 in the applied artificial intelligence and expert systems field.

### **Major Fields**

**Information Systems Development**—This field provides thorough preparation for a career in the application of computers to the complex data and information problems found in organizations today. The program emphasizes the practical

understanding of contemporary design and implementation approaches within the development of computer-based systems.

**Applied Artificial Intelligence and Expert Systems**—This field stresses the practical applications and basic underpinnings of artificial intelligence, especially expert and knowledge-based systems. The program provides a firm foundation in information systems technology, while emphasizing aspects of applied artificial intelligence and knowledge engineering.

**Information Systems Project Management**—This field provides a preparation for managing information systems projects by providing a solid technical foundation in information systems coupled with course work covering a variety of areas of project management. The combination of technology, organizational behavior, project and organization management, and decision support technologies presented in an information systems project context provides a thorough preparation for a career in information systems project management.

### **Master of Taxation**

The Master of Taxation degree is designed to prepare students for careers as tax professionals in public accounting, private industry, and government. The program of study provides a thorough understanding of the tax laws and their application.

The program consists of 48 credit hours of course work, of which 18 hours of first-level courses may be waived if comparable study has been completed prior to admission. Six credit hours of the minimum program of 30 hours of course work may be awarded as advanced standing.

The program of study consists of two levels.

**First Level**—Accy 201, 202, 211; Econ 217; Mgt 270; Fina 220. All of these course requirements may be satisfied by evidence of successful completion of comparable work at other regionally accredited institutions. First-level courses may not be taken to satisfy second-level requirements or electives.

#### **Second Level**

1. **Required Courses:** Accy 261, 262, 263, 264, 265, 269.

2. **Electives:** Four graduate-level SBPM courses are selected in consultation with the designated faculty advisor. With advisor approval, National Law Center courses or graduate-level economics courses may be substituted for SBPM courses.

Students who intend to take the C.P.A. examination should be aware that the course work required for admission to the examination varies from state to state. Students are advised to consult the Board of Accountancy for the state in which they plan to take the examination and choose electives that meet that state's requirements.

### **Specialist in Health Services Administration**

Students with a master's degree in an approved related field or with a master's degree and managerial experience may undertake studies leading to the degree of Specialist in Health Services Administration. This program serves people who plan to begin a career in management, policy-making, or planning in the field of health services or who wish to supplement previous graduate study in health services administration.

Most students with adequate preparation in health services administration or a related management field should be able to complete the requirements by undertaking a 30-credit-hour program of study. Those lacking specialized preparation will need additional course work, depending on career goals. Field experience assignments, if required, are in addition to the 30-credit-hour minimum.



Individual programs will be developed in consultation with a faculty advisor on the basis of the student's educational background, experience, and specific professional objectives.

All students must take at least one doctoral-level seminar in health services administration (HSMP 310 or 330) and complete a 3-credit-hour research project (HSMP 270). The remaining hours may be taken in health services management and policy or other appropriate disciplines.

### **Doctoral Program**

The degree of Doctor of Philosophy is offered in accountancy, business administration, health services administration, information and decision systems, management and organization, and public administration. The Committee on Doctoral Studies supervises all aspects of the program.

### **Admission**

The minimum admission requirement is a bachelor's degree from a regionally accredited college or university, preferably with a major appropriate to the proposed field of study. Most applicants have completed a master's degree in an appropriate field. Applicants whose degrees are in fields other than their proposed field of study are expected to obtain the necessary background either before or soon after admission to the program. Scores on the Graduate Record Examination or the Graduate Management Admission Test are required. Under special circumstances, scores on the Miller Analogies Test may also be submitted. Applicants whose test scores are more than 10 years old are required to take or retake the Graduate Record Examination or the Graduate Management Admission Test. Applicants whose test scores are more than five years old are encouraged but not required to take or retake either of the tests. Arrangements to take the tests must be made with the Educational Testing Service. Students whose native language is not English must also submit the Test of English as a Foreign Language (TOEFL) scores with a total score of not less than 600.

The Doctoral Committee does not use specific cutoff points for grade averages and test scores. It carefully reviews each applicant's entire record and makes its selection on a competitive basis in keeping with enrollment limitations.

### **Plan of Study**

The doctoral program consists of two major parts: the pre-dissertation stage and the dissertation stage. The objective of the pre-dissertation stage is to provide the student with the theoretical foundations and practices of the primary and supporting fields of study and with a command of the relevant qualitative or quantitative analytical methods. The objective of the dissertation stage is to have the student apply the obtained theoretical and practical knowledge and analytical methods to the resolution of a research problem. The research should be original and is expected to result in a contribution, either applied or theoretical, to the existing body of knowledge. The total program must be finished in seven years. If a student is granted an extension beyond the seventh year (14 semesters), the student must register and pay for 3 credit hours of Dissertation Research at the then-current tuition rate every semester until graduation.

The pre-dissertation stage is based on an individual study plan developed by the student under the guidance of the primary and supporting field advisors during the first academic year. In the study plan the student must state long-range professional objectives, all proposed academic activities, methods of evaluation, and a semester-by-semester schedule.

All students, regardless of the primary field of study, must include in their study plan Mgt 390, Philosophical Foundations of Administrative Research, and

the multidisciplinary course, 311, Seminar: Public-Private Sector Institutions and Relationships. These courses should be taken during the first academic year after admission. Mgt 391, Methodological Foundations of Administrative Research, must be taken at the end of course work.

In addition to the evaluation methods proposed in the study plan, the primary and supporting field advisors evaluate the student's progress at the end of the first and second semesters after admission, and thereafter at the end of the spring semester of each academic year. A comprehensive evaluation of study plan activities for both the primary and supporting fields is the final process of the pre-dissertation stage.

As background, a student whose field is designated as Business Administration must demonstrate, either through prior academic experience or through the proposed content of the doctoral study plan, a working knowledge of the principal content areas of business administration.

Supporting fields may be chosen from other departments of the University. A student selecting a field outside of the School, however, must meet the academic and administrative requirements of the department involved.

For more detailed information on the program and its administration, see the *Handbook on the Doctoral Program*, available in the Doctoral Program Office.

## **Special Programs**

### **Executive Master of Business Administration**

The Executive Master of Business Administration program, offered at GW's Virginia Campus, is specifically designed to meet the needs of middle- and senior-level executives without career interruption. The carefully tailored curriculum emphasizes a general management approach with all the rigor and academic quality of a traditional M.B.A. degree. This 20-month program is highlighted by four week-long residencies and an international study session held abroad. Up to 35 participants move through the entire course of study as a cohort group, taking all classes together.

### **International Institute for Health Services Administration**

In recognition of special educational needs of students from other countries, the International Institute for Health Services Administration offers programs of instruction designed to meet these needs at either the degree or certificate level.

It is also equipped to enter into arrangements with principals of hospital systems in worldwide areas to assist in the preparation of teaching programs or the actual instruction of administrative personnel either abroad or at the University.

### **Joint Degree Programs**

Students may work concurrently toward both the Juris Doctor degree in the National Law Center and the following degree programs in the School of Business and Public Management: Master of Business Administration, Master of Public Administration, and Master of Health Services Administration. In consultation with their designated faculty advisor, students in these programs may transfer up to 14 credits of National Law Center course work to their SBPM program and 12 credits of SBPM course work to fulfill requirements for the Juris Doctor degree. Students must be admitted separately both to the National Law Center and to the School of Business and Public Management and must meet all requirements in each degree program prior to receiving either diploma. It is possible for a student to complete work for both degree programs within four years.

In addition, a recently established joint degree program leads to a master's degree through GW's Department of Health Services Management and Policy and



the Master of Science in Nursing from The Catholic University of America. The 61-credit-hour program is available to students who hold a bachelor's degree in nursing. Application for admission is made separately to both programs, although initial application is made to Catholic University. Further information may be obtained from the Department of Health Services Management and Policy.



## SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

Dean P.P. Smith

Associate Deans J.C. Heddeshimer, R.N. Ianacone

### Introduction

The School of Education and Human Development prepares teachers, human service and service industry personnel, resource and support personnel, and administrators for professional service. The School also offers opportunities to experienced professionals to extend and enrich their education. The programs are designed to meet the broad needs of persons who seek knowledge and skills necessary to provide effective learning and teaching, research, services, and leadership in a variety of settings. The School's programs address the preparation of individuals for all areas of education and human development, covering the life span from pre-school through the adult years in both the public and private sectors of society.

Programs provide opportunities for students to develop critical thinking and reasoning, as well as leadership, organizational, and planning skills. Emphasis is placed upon developing the human relationship qualities that are essential in fields that require involvement with people in all age ranges and from all walks of life.

The School of Education and Human Development is the administrative unit for four departments: Educational Leadership, Exercise Science and Tourism Studies, Human Services, and Teacher Preparation and Special Education. In addition to programs of study leading to its degrees, the School offers credit and noncredit workshops designed specifically to meet the unique needs of metropolitan area school systems and other clientele in private industry and government.

Special curricula are tailored on an individual basis for liberal arts graduates and graduates of other professional schools who are interested in teaching or in other human services areas. The School also offers a wide range of courses for teachers who wish to renew licenses and for provisional teachers who wish to prepare for teaching certificates.

Laboratory and clinical facilities are provided by the Counseling Laboratory and internship placements in the community. Field experiences are provided in cooperation with public and private schools, social and health agencies, museums, institutions in the business community, and community and junior colleges.

### Education for Careers in Teaching

Programs of study for teaching careers are based upon the assumption that every teacher should have a broad general education, mastery of specialty studies

related to the content of instruction, and professional knowledge and competencies. The relative emphasis placed upon each of these aspects of the total education for teaching varies in accordance with the purposes of each program.

### **Education for Careers in Human Services and Human Development**

Programs of study for human service and human development careers are offered in the School of Education and Human Development. Master's degree programs offer advanced specialized studies in a selected field, and doctoral programs provide leadership, research, and advanced professional skills. At the master's degree level, programs include community counseling, education policy studies, exercise science, human resource development, museum education, rehabilitation counseling, and tourism administration. Specialist programs are offered in counseling, human resource development, and special education. Doctoral programs are offered in human resource development, educational administration and policy studies, counseling, and human development.

### **Regulations**

See Fees and Financial Regulations; University Regulations.

### **Grades**

For graduate work, grades are indicated as A, Excellent; B, Good; C, Minimum Pass; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal; CR, Credit. Grades A, B, C, and F are counted in computing the grade-point average (see University Regulations).

Whenever a grade has not been assigned, the symbols *I* (Incomplete) or the *W* (Authorized Withdrawal) will be recorded. The *I* indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. An instructor recording a grade of *I* will normally stipulate a date by which work must be completed. The instructor has the responsibility for changing the grade of *I* to an appropriate grade upon completion of work or, if work is not completed by the stipulated date, determining whether the grade of *I* should be changed to *F* or allowed to remain in the record. The grade of *I* remains on the student's record along with the completed grade.

### **Use of Correct English**

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the dean. The dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up such deficiency in English to the satisfaction of the dean.

### **International Students**

In addition to all listed criteria for admissions, students from countries where English is not an official language are required to take the Test of English as a Foreign Language (TOEFL). A minimum TOEFL score of 550 is required for consideration for admission. All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.



### **The Degree of Master of Arts in Teaching in the Field of Museum Education**

The School of Education and Human Development offers an intensive interdisciplinary program in museum education. The program is designed to prepare selected graduates, postgraduates, and professionals for work in art, history, or science museums; zoos, aquaria, or nature centers; and historical societies or sites. Graduates also qualify to serve as liaison persons between schools and museums and as professionals in museum-related private and public agencies.

Those interested in museum studies more generally should refer to Museum Studies under Courses of Instruction.

#### **Admission Requirements**

To be admitted to the program in museum education an applicant must have a bachelor's degree from an accredited institution; present three written references attesting to quality of academic record and work experience; submit scores on either the Graduate Record Examination or the Miller Analogies Test; and be interviewed by the Selection Committee or make alternative arrangements specified by the Committee. Skills in communication, a desire to study and learn from museum collections, and an ability to work with people are essential. Evidence of strong undergraduate, graduate, or professional experience in such fields as American studies, anthropology, art history, fine arts, history, or the biological, physical, or social sciences is desirable.

#### **Plan of Study**

All degree candidates take five sequential core courses in three successive semesters beginning in June and ending in April of the following year. Each student also pursues four elective courses in a chosen museum-related academic discipline and/or museology. Two carefully supervised field placements provide direct museum education experience. In the fall semester, students serve two days a week as museum resource specialists in an educational site. In the spring semester, students hold four-day-a-week internships in a museum or museum-related organization. The program requires completion of 33 credit hours.

### **The Degree of Master of Education**

*Elementary Education*—The Master of Education in the field of elementary education is designed for those with an undergraduate degree in a major other than education. The minimum 45-credit-hour program includes course work for students who wish to become eligible for certification for teaching at the elementary school level; additional course work in content areas may be needed to meet specific jurisdictional requirements for certification.

*Secondary Education*—The Master of Education in the field of secondary education is designed for those with an undergraduate degree in a major (or with substantial course work) in a field taught in secondary schools. The 36-credit-hour program provides eligibility for teacher certification and includes 24 hours of required courses in education theory and pedagogy and 12 hours that may be in either education or the subject area intended to be taught.

### **The Degree of Master of Arts in Education and Human Development**

The degree programs leading to the Master of Arts in Education and Human Development are designed to provide students with specialized knowledge and skills required for advanced professional competence in a variety of educational, human development, human service, and service industry careers. Each program of study involves a combination of classroom and field-based learning experiences tailored to a professional specialty and individual student needs.

Students engage in a wide range of teaching and research approaches that reflect the School's commitment to excellence in professional education.

The diversity of master's programs in the School of Education and Human Development reflects its belief that education and human development comprise a multifaceted enterprise reaching persons of all ages in a variety of settings. These programs develop professional knowledge, skills, and attitudes that will enable graduates to foster human learning, growth, and development in individuals throughout society. Depending on the program specialty, students are prepared to pursue careers in schools, universities, community-based and human service organizations, cultural and leisure institutions, and business and government settings.

Master's programs are available in the fields listed on the following pages.

**Counseling**—The master's programs in counseling are designed to provide three specialty concentrations and one subspecialty concentration for entry-level positions in professional counseling. Program graduates are prepared to specialize in a specific field and to work in a variety of settings in which professional counseling is offered. All counseling concentrations require the equivalent of two full years of study and provide core learning experiences that combine professional and behavioral studies with supervised laboratory, practicum, and internship experiences. Some programs have specific prerequisites in addition to the general admissions requirements. The master's programs in school counseling and community counseling and the doctoral program in counseling are accredited by the Council for the Accreditation of Counseling and Related Educational Programs. The master's program in rehabilitation counseling is accredited by the Council on Rehabilitation Education.

Students who successfully complete a graduate program in counseling are eligible to apply for certification by the National Board of Certified Counselors. Students who successfully complete the graduate program in rehabilitation counseling are eligible to apply for certification by the Commission on Rehabilitation Counselor Certification. State licensure and certification are available in most states, and requirements vary by state.

The core course of studies for all program concentrations includes course work in the foundations of counseling, human behavior and development, mental health problems, testing and appraisal, career development, individual and group counseling, cross-cultural counseling, and research and statistics.

**Community Counseling**—This is a 48-credit-hour program. Candidates who complete the program are prepared to enter the counseling profession in a variety of human service settings, including welfare and other social service agencies, penal institutions, court systems, employment centers, allied health agencies, government service agencies, community college counseling centers, employee assistance programs, and private practice.

**School Counseling**—This 48-credit-hour program provides professional preparation for individuals to become certified as counselors in public and private schools. The program is designed to provide students with the requisite knowledge and skills to provide professional counseling, assessment, consultation, and guidance services in a school setting.

**Rehabilitation Counseling**—This program prepares rehabilitation counselors to assist persons who are physically, mentally, emotionally, or socially disabled to assume or resume their place in society. The rehabilitation counselor works with the client to develop and implement a plan to assist in such areas as independent living, job placement, supported employment, overcoming substance abuse and other physical and social barriers to living a full and satisfying life. The program requires 51 credit hours. In an accelerated program, persons with an undergraduate degree in human services/rehabilitation services can complete this program with a minimum of 42 credit hours.



**Employee Assistance Counseling**—This subspecialty can be elected as part of either the community counseling or rehabilitation counseling programs. The subspecialty is designed to prepare graduates as professional counselors in employee assistance programs in business, industry, and government settings.

**Curriculum and Instruction**—This program is designed to prepare teachers and other educational personnel for increased responsibilities in the planning, implementation, and evaluation of curriculum and instruction.

The 36-credit-hour program includes study in curriculum development, research and evaluation of instructional practice, teacher education, work with special populations, and school policy and management. A program specialization may include advanced study in elementary education, a content area of secondary education, English as a second language, reading, or special education. A practicum is required.

**Education Policy Studies**—The program in education policy studies is designed for students who wish to develop skills in the technical, political, and managerial aspects of education policy analysis. Emphasis is placed on developing both a broad understanding of the political and social environment in which education policy is formulated and the technical competence to undertake independent analysis of a policy initiative. Internships are offered in a variety of federal, state, and local agencies.

The 36-credit-hour program includes course work in the policy-making process, planning, evaluation, and current social policies influencing education. At least 9 hours of electives must be taken in a field of specialization.

**Educational Technology Leadership**—This program is designed for persons who are entering or advancing in positions associated with schools, higher education, alternative educational settings, or other human service occupations in which computers and related information delivery technologies are used. The program of studies provides students with opportunities to develop the knowledge, understanding, and skills necessary to provide leadership in the rapidly changing environment of technology use in education.

The 36-hour program includes required course work in the theory and practice of educational technology, including the use of computers and other instructional technology systems, technological management systems, policymaking, research methods, and leadership. Some classes are offered on interactive instructional television. Twelve hours of the program are specialization electives, which can be chosen, with the advisor's consent, from other departments in the University.

**Elementary/Secondary Administration**—This program provides the entry-level professional with preparation for certification in leadership positions, such as principal, assistant principal, and department head in elementary and secondary schools. Candidates must have a minimum of three years of successful teaching experience.

The 33-credit-hour program includes courses in fundamentals of educational administration, foundations of curriculum development, supervision of instruction, the K-12 principalship, supervision in the elementary and secondary schools, school business management, human relations in educational management, and school law. Certification requirements for some states may extend the program beyond 33 credit hours.

**Exercise Science**—This program is designed to provide the academic and practical preparation to assess physical fitness, design and evaluate exercise programs, identify sports injuries, identify ECG abnormalities and other factors related to fitness, and apply principles of exercise physiology and kinesiology to physical conditioning and performance. Graduates are prepared to work in

health and fitness programs in industry, business, and government agencies, in exercise rehabilitation programs, and in community service programs. The 36-credit-hour program includes course work in exercise for older adults and other special populations, fitness evaluation and exercise prescription, sports medicine, employee health and fitness programs, and exercise, stress, and cardiac rehabilitation. Practicum opportunities are available both on and off campus.

**Higher Education Administration**—This program prepares students for administrative positions in institutions of higher education, associations, national and international government agencies, and business and industry. The program is designed so that a student may select a concentration in administration, teaching, or curriculum. The course of studies offers an intensive review of the history, scope, present status, and trends of higher education in the United States in comparison to selected systems in other parts of the world. Students gain knowledge and skills related to the governance, organization, and administration of colleges and universities.

The 39-credit-hour program includes courses on higher education in the United States, administration of higher education, and the community/junior college. An internship is required.

**Human Resource Development**—This program is designed for persons entering or advancing in positions associated with learning in organizational settings in business, industry, government, and other large organizations in the public or private sector. The program is interdisciplinary, and students are encouraged to tailor their programs to individual career needs and objectives.

The five required courses in the 36-credit-hour program include foundations and issues of human resource development, adult learning, group dynamics, and organizational analysis. Fieldwork in cooperating Washington-area business, industry, government, and community organizations may be a part of the learning experience.

**Individualized Program**—This program provides the opportunity to develop an individualized curriculum that cuts across existing fields, both within the School of Education and Human Development and between the School and other schools and departments of the University and the Consortium. The program is designed to meet specific, identified career and professional objectives of applicants who have unique needs. The flexible program structure can be tailored to prepare for new and emerging fields in education and human development.

This program of 36 credit hours is available within or across the four departments of the School of Education and Human Development. Except for students who base their program within the Department of Exercise Science and Tourism Studies, the program must contain a 12-credit-hour core curriculum consisting of courses in human development, social/historical philosophical foundations in education, and curriculum. The remaining 24 credit hours must correspond directly to the program objectives and bear a direct relationship to each of the areas identified above. A minimum of 6 credit hours of fieldwork, or the equivalent, must be a part of the program. All work toward the degree must be specified at the time the initial program is developed.

**International Education**—This program is designed for persons who are entering or advancing in positions associated with training, education, adult learning, and development activities in diverse settings that require international understanding. The program provides knowledge of other countries and cultures, using the education system as a means of interpreting and translating knowledge across cultures and analysis of the formal and nonformal school systems as they reflect history, culture, development, values, contemporary concerns, and future trends.

The 33-credit-hour program allows a selection from a variety of subspecialization areas. Four courses are chosen from international education, comparative



education, selected topics in international education, international experiences, and future trends. A 9-credit-hour subspecialty complements the major area of study and may be taken in any division of the University. A comprehensive examination is required.

**Reading Progress Management: Classroom and Clinic**—This program is planned to prepare reading education professionals as special teachers, clinicians, consultants, and supervisors. The program develops competencies in the foundations of reading instruction, classroom and individual diagnosis and treatment, and specialized knowledge areas reflecting the student's career interests. This enables students to meet the professional standards for reading specialists as specified by the International Reading Association. Theory and practice are carefully integrated in classroom courses and in practicums that are school-based or clinic-based.

The 33-credit-hour program includes courses in foundations of reading development, diagnostic teaching of reading (K-6), clinical study of reading problems, and assessment of cognitive functioning. Depending on a student's career interests, courses are taken in reading in the content areas at the elementary or secondary level, cognitive models and instruction, the organization and administration of reading programs, or severe learning disabilities in reading.

**Special Education**—The four master's programs in special education provide core and specialty studies and field experiences designed to prepare highly competent and committed professionals for a broad range of educational and leadership roles in the field of special education and related services.

**Early Childhood Special Education**—This program is designed to prepare educators with insight and knowledge in the areas of the development of young exceptional children, handicapping conditions, identification and assessment procedures, and clinical teaching and alternative models of service for children with, or at risk for, disabilities. The program prepares students for teaching and consultative roles.

The 39-credit-hour program includes courses in language development, typical and atypical development, developmental and formal assessment, interdisciplinary theory, professional roles, family intervention skills, behavior management, and legal policy concerns. A practicum and internship are required.

**Infant Special Education**—This program is designed to prepare professionals to serve the needs of infants and toddlers with, or at risk for, disabilities and their families. The course of study prepares students to perform direct service, administrative, consultative, and research roles in health care, human services, and educational settings. Internships in specialization areas include hospital-based programs, infant intervention settings, developmental assessment clinics, research facilities, day-care centers, and advocacy organizations.

The 39-credit-hour program includes courses in medical issues, infant development and assessment, neurodevelopmental programming, technology, family systems intervention, case-management approaches, and interdisciplinary team functioning. A practicum and internship are required.

**Special Education for Seriously Emotionally Disturbed Students**—This program prepares special educators to work as members of multidisciplinary teams in residential sites, extended day-care centers, and schools that serve seriously emotionally disturbed students. Participants develop professional skills to assess problems, plan teaching strategies, create a therapeutic milieu, tap multi-agency resources, counsel students and their families, and build realistic learning and living expectations.

The 36-credit-hour program includes courses in developmental assessment, psychoeducational characteristics of the seriously emotionally disturbed student, specialized curriculum methods and intervention strategies, and interdisciplinary theory and planning approaches. Students are required to participate in an intern-

ship and in course work or clinical experiences in the Educational Leadership, Psychiatry and Behavioral Sciences, and Psychology Departments.

**Transitional Special Education**—This program is designed to train those who help youth and adults with special needs to make the transition from school to independent living and employment. The program requires at least 39 credit hours of graduate course work and field experience, although the total number of hours will vary depending on the certification options selected by the student. The following areas of specialization are offered: secondary and vocational programming, collaborative vocational evaluation, corrections, school-based vocational evaluation, and learning disabilities.

**Supervision**—This program is designed primarily to prepare teachers and other educational personnel for increased responsibility in teaching and for supervisory positions. The program offerings lead toward certification eligibility for supervisory positions in most school jurisdictions. Basic courses relate to general supervisory principles and responsibilities and are also of interest to educators in non-school educational and human service agencies. Candidates who do not have teaching experience may be required to enroll in an extra field experience.

The 33-credit-hour program includes courses in the foundations of curriculum development, human relations in educational management, supervision of instruction, school law, and supervision in the elementary and secondary school. Appropriate elective courses, selected with the approval of a faculty advisor, allow students to increase knowledge and skills in teaching content areas and in other humanistic and behavioral disciplines related to education and supervision. The program is structured to meet certification requirements in the District of Columbia, Maryland, Virginia, and some other states.

**Tourism Administration**—This is an internationally oriented program concerned with the professional and research aspects of travel and tourism. It places priority on preparation of career entry and mid-level management positions in public service organizations providing tourism services at the local, state/provincial, regional, national, and international levels as well as in public, nonprofit, and private-sector organizations involved in integrated and cooperative marketing of tourism destinations, products, and services. Students may develop individualized study plans based upon defined career requirements and utilizing the resources of the University and the Washington metropolitan area.

Thirty-nine credit hours are required, including five core courses, six courses in one of three component concentrations, and an advanced seminar and practicum. Core courses include economic, social, cultural, and ecological aspects of tourism, tourism administration, tourism research, and tourism systems analysis. A 36-credit-hour thesis program with a comprehensive examination is available.

#### **Admission Requirements for the Master of Arts in Education and Human Development**

The School of Education and Human Development seeks applicants with strong academic potential, high motivation, and aptitude to do graduate-level work. Admission decisions are based on an evaluation of all material submitted in support of the application. The School requires official transcripts of all previous undergraduate and graduate course work and acceptable test scores on either the Graduate Record Examination or the Miller Analogies Test.

Two letters of recommendation and a personal interview with the Graduate Admissions Coordinator are required. The interview may be waived with permission of the coordinator for those living outside the Washington metropolitan area.



In addition to these basic requirements, individual programs may require personal interviews, relevant professional experience, and other supporting documentation before a final decision on admission is made. Upon receipt of the application to the individual School program, information on specific requirements will be sent to the applicant. The personal interview, professional experience, and supporting references provide important qualitative evidence concerning an applicant's academic potential and professional background.

The admission review is based upon a comparison of qualifications among all those who apply, weighing both the School's general admissions criteria and program-specific criteria.

Positive decisions are made quickly for applicants who present uniformly strong application credentials in all areas. In some cases, unusually strong factors will offset comparatively weak factors and result in an offer of admission to provisional status in the School. For a student to be admitted to full candidacy from provisional status, he or she must earn grades of B or better in the first 9 credit hours of course work. Grades of I are not acceptable.

### **Advanced Standing**

Advanced standing is granted for approved courses taken at other accredited institutions, but a minimum of 24 credit hours must be completed in the School of Education and Human Development as a master's candidate. A maximum of 12 credit hours taken in nondegree status may be credited toward the master's degree.

Advanced standing is not granted for work completed five or more years before application for admission or readmission to master's candidacy. All work accepted for advanced standing must have been earned with a grade of B or better and must be approved for acceptance by both the advisor and the dean. Credit, Satisfactory, Audit, or other nonletter grades are not acceptable.

### **Plan of Study**

The plan of study leading to the degree of Master of Arts in Education and Human Development requires a minimum of 33 hours of graduate credit. Several programs have additional credit hour requirements. The plan may, at the student's option, include a thesis carrying six hours of graduate credit. Whether or not a student selects the thesis option, a minimum of 18 hours must be from courses planned primarily for graduate students (third-group courses). A minimum of 12 hours, not including the thesis, must be from courses offered by the School of Education and Human Development.

Programs are initially reviewed in conference with an admission advisor in the School of Education and Human Development and subsequently finalized with a designated advisor in the candidate's area of specialization. Programs are based on a candidate's interests and background; those related to teaching in public schools are designed around certification requirements of the state and locality in which the candidate plans to teach.

All degree requirements must be completed within six years, whether study is full time or part time. An additional (or seventh) year is allowed in the case of a student who breaks enrollment and is subsequently readmitted.

### **Continuous Enrollment and Residence**

Students must be continuously enrolled in the School of Education and Human Development unless the dean grants a leave of absence. Failure to register each semester of the academic year will result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the School.

Students who are graduating, requesting grade changes from that of Incomplete, or taking the comprehensive examination must be registered for at least 1 credit hour during the semester in which these activities take place. Continuous enrollment or leave of absence status is not acceptable in these circumstances. Students may, however, choose to wait for a semester in which they are actively registered for courses to finish Incompletes. It is necessary to register for the summer sessions only if the student is applying to graduate during the summer.

### **Scholarship**

A grade-point average of 3.0 is required for graduation. Students who receive the grade of C in more than six credit hours are subject to suspension. Students who receive a grade of F must confer with the dean before enrollment for further work.

### **The Thesis**

Students may elect a thesis option. The choice of the thesis subject must be approved in writing by the student's advisor and filed in the office of the dean. A statement of the School's standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the office of the dean.

Payment of tuition for the thesis course entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time may be granted. The student must, however, be enrolled continuously in the program. If the preparation of the thesis extends beyond the additional time granted, the student must register for the entire six hours of thesis again and pay tuition as for a repeated course.

### **Master's Comprehensive Examination**

Candidates in master's programs requiring 33 credit hours must take a comprehensive examination. Candidates in some nonteaching programs whose basic requirements exceed 36 credit hours may waive the comprehensive examination with approval of the academic advisor. Candidates who plan to take the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the office of the School of Education and Human Development no later than 30 days prior to the date of the examination. Comprehensive examinations are required of students in Elementary Secondary Administration, Supervision, and all programs in Exercise Science and Tourism Studies and in Teacher Preparation and Special Education.

### **Work in Other Academic Departments**

For teachers interested in developing or strengthening their academic competence, the master's program in Curriculum and Instruction encourages 12 to 15 credit hours of work in departments other than education. The program is designed to meet the need of in-service teachers for additional work in a content area to qualify for advanced certification or to improve classroom skills and may also be helpful to previously trained teachers planning to re-enter the profession. The major emphasis is upon strengthening both academic and professional competencies.

### **Second Master's Degree**

Persons seeking a second master's degree in the School of Education and Human Development must complete all core and specialization requirements and a minimum residency requirement of 24 credit hours.



### **The Degree of Education Specialist**

The program of advanced study leading to the degree of Education Specialist is for students with master's degrees in education who seek further professional preparation for specific objectives.

The program is under the supervision of the Advanced Graduate Faculty and is available in the fields of administration, counseling, curriculum and instruction, higher education, human resource development, and special education.

#### **Admissions Requirements**

The following are required for entrance to an Education Specialist program: a Master of Arts in Education and Human Development or its equivalent, two years of pertinent experience in an education or human development field, and a graduate scholastic average of at least 3.3 and an acceptable score on either the Graduate Record Examination or Miller Analogies Test. Two letters of recommendation, one from a professional supervisor and one from the most recent graduate faculty advisor, are required, along with a statement of professional goals. Each applicant must be interviewed and recommended by a faculty advisor in the major field.

#### **Scholarship**

Scholarship requirements for the degree of Education Specialist are the same as those for the degree of Master of Arts in Education and Human Development (see above).

#### **Programs of Study and Degree Requirements**

Individual programs are developed, through a plan of study worked out with a faculty advisor, to fit the candidate's skills, interests, and career goals. A minimum of 30 credit hours beyond the requirements of the degree of Master of Arts in Education and Human Development is required. At least 21 hours of this work must be taken in residence at GW. A maximum of five calendar years is allowed for completion of the program.

At least 12 of the required 30 hours must be in appropriate graduate courses in education selected from the following areas: (1) foundations and cognate study, (2) background and general principles of the field of study, and (3) an area of specialization. A graduate-level research methods course must be included in the program if it was not completed in previous graduate work.

#### **The Comprehensive Examination**

Successful completion of a six-hour written examination and/or an oral examination, at the option of the major field advisor, is required. Candidates taking the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the dean's office at least 30 days prior to the date of the examination.

### **The Degree of Doctor of Education**

The School of Education and Human Development offers programs of advanced study leading to the degree of Doctor of Education. These programs, which are under the supervision of the Advanced Graduate Faculty, provide major fields of study in curriculum and instruction, special education, counseling, human development, educational administration and policy studies, human resource development, and higher education administration. Supporting fields are available in administration, higher education administration, counseling, curriculum and instruction, elementary education, human development, human resource

development, international education, program evaluation, reading, secondary education, special education, supervision, teacher education, and tourism administration. With the approval of a student's program planning committee, course work may be taken in other departments of the University. All programs require study of interrelated areas of education and a doctoral dissertation in the major field of study.

All doctoral programs are designed to accommodate the needs of working professionals who must pursue their studies on a part-time basis. Required graduate courses, with few exceptions, are offered in the late afternoon and evening. In some programs, selected courses may be taken at off-campus locations.

### **Admission Requirements**

The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his or her objective and comparable to that required for the degree of Master of Arts in Education and Human Development at this University. Students with a master's degree in a field other than education may be considered for doctoral study provided that the degree and previous experience are judged relevant by the major field program faculty.

For an application to be forwarded to the major field program faculty for their consideration, an applicant must have a minimum graduate scholastic average of 3.3 and a 50th percentile score on the Miller Analogies Test or Graduate Record Examination. Under certain circumstances, the associate dean may recommend to the faculty a student who does not meet the stated criteria but who has shown exceptional promise in the chosen field. Programs often set higher admission standards, and the number of spaces available for new doctoral students limits the number that can be accepted.

The applicant is strongly encouraged to schedule an interview with the graduate admissions coordinator, who will discuss the applicant's needs in relation to the School's resources, explain the required procedures and standards, and guide the applicant through the admission process. In addition, all applicants must have an interview with faculty members in the major field. Students receiving favorable recommendations from the major field faculty are admitted to precandidacy for the degree.

### **Precandidacy**

In the precandidacy period a minimum of nine credit hours of course work in the program, including requirements specified by the Advanced Graduate Faculty, must be completed. Full-time students must complete this work within the first 18 credit hours; part-time students must complete it within three semesters of admission to precandidacy. Application for full candidacy will then be decided on the basis of the quality of scholarship in the precandidacy period, the recommendations of instructors, a detailed plan for the balance of the program, and a qualifying examination.

### **Plan of Study**

In general, from two to three years of full-time study beyond the master's degree in education, or the equivalent in part-time study, are required. Course work and examinations must be completed within five years, and the entire program must be completed within eight years. The minimum residency requirement is 36 credit hours of course work beyond the master's degree in education, plus 12 to 24 hours of dissertation research. In most cases, course work beyond the minimum is required.

Programs are individually planned. Each program is divided into two parts. The first consists of studies preparatory to taking major and supporting field



comprehensive examinations and required research tool studies. The second consists of the doctoral dissertation and the final oral examination.

Upon admission to doctoral candidacy, the student is assigned to a program planning committee of three faculty members, one of whom must be from outside the major field of study. Students who have completed the comprehensive examinations and have received committee approval of a dissertation proposal must register for 6 hours of Dissertation Research in two consecutive semesters and 3 hours per semester thereafter, until the satisfactory completion of the dissertation or the completion of 24 credit hours of dissertation research. More specific information is available in the *Doctoral Student Handbook*.

### **Comprehensive Examinations**

No later than the end of the third semester, the student must pass a three-hour qualifying examination, the content of which includes material from both the major field of study and foundations of education. Doctoral students who received an Ed.S. from this University, having consequently taken a comprehensive examination, are required only to take the foundations portion of the qualifying examination. All course work, including the research tool requirement, must be successfully completed prior to taking the integrative comprehensive examination (the only exception is the Pre-Dissertation Seminar). The integrative comprehensive examination is a written 12-hour examination, six hours on each of two successive days. The candidate begins the second part of the program after the satisfactory completion of all examinations and the required research tool field. Candidates taking the examination must be registered for at least 1 credit hour in the semester it is to be taken and must file a written application in the dean's office at least 30 days prior to the date of the examination.

### **The Dissertation**

A dissertation is required as evidence of ability to perform original scholarly research and to interpret and present its results.

At the beginning of the dissertation phase, the dean appoints a dissertation committee, consisting of a chairperson (usually a faculty member in the major field) and two additional faculty members. The candidate is required to submit a proposal for the dissertation to this committee, which determines its acceptability. The dissertation is completed under the guidance of the chairperson, with the advice of the other members of the dissertation committee.

To graduate in a particular semester, the candidate must submit to the dean, no later than the date specified in the calendar, four complete copies of the dissertation and an abstract and biographical sketch for inclusion in the announcement of the examination and for reproduction by University Microfilms, Inc. Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in the office of the dean. The successful candidate for the doctorate is required, before receiving the degree, to pay fees that are applied toward the expense of binding library copies of the dissertation, printing the Announcement of the Final Examination, and the basic service rendered by University Microfilms, Inc., and to sign a microfilm agreement.

### **The Final Examination**

When the dissertation has approval of the dissertation chairman and at least one other committee member, the candidate is recommended to the dean for the final oral examination, which must be passed at least 30 days before the degree is to be conferred. The examination is open to the public and is conducted by a committee of the faculty, appointed by the dean, supplemented by at least two leaders in

the candidate's field of study from outside the University. Candidates who successfully pass the oral examination are recommended for the degree by the faculty of the School of Education and Human Development. Three final edited copies of the dissertation must be submitted to the office of the dean within one month of the final oral examination and no later than one month before the degree is to be conferred.

#### **Continuous Study and Residence**

Students must be continuously enrolled in the School of Education and Human Development, unless the dean or the Advanced Graduate Faculty grants a leave of absence. Failure to register each semester of the academic year may result in lapse of candidacy. Subsequent readmission is subject to whatever new conditions and regulations have been established by the Advanced Graduate Faculty.

#### **Teacher Certification Curricula**

The School of Education and Human Development provides programs for liberal arts graduates with appropriate degrees from accredited institutions who wish to prepare for teaching. Those seeking certification, but not wishing to work for a degree, may enroll in a certification program if they meet the admission and scholarship requirements of degree candidates. The School also provides a wide range of courses of interest to teachers who wish to renew licenses.

#### **Off-Campus Degree Programs**

The School of Education and Human Development offers off-campus programs leading to the Master of Arts in Education and Human Development in the fields of educational technology leadership, elementary/secondary administration, higher education administration, and supervision and the Education Specialist in the fields of administration, human resource development, and higher education. The programs are administered through the Division of Continuing Education.



## SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Dean G. Frieder

Acting Associate Dean R.M. Soland

### Introduction

The School of Engineering and Applied Science was organized in 1884 as the Corcoran Scientific School of Columbian University. It was named in honor of William W. Corcoran, president of the University's Board of Trustees from 1869 to 1888. The school was among the first to accept women for degree candidacy in engineering.

The organization and offerings of the school have changed several times over the years, but throughout most of its history the program has been characterized by its emphasis on principles rather than technology. The current name was adopted in 1962.

Through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management; and Operations Research—the School of Engineering and Applied Science offers graduate study leading to the degrees of Master of Science, Master of Engineering Management, and Doctor of Science and to the professional degrees of Engineer and Applied Scientist. Programs are individually planned according to the student's preparation and needs.

The School of Engineering and Applied Science maintains extensive and varied computing facilities as well as an array of laboratory facilities to support study and research in such areas as general-purpose electronics, computer science, graphics, computer-aided design, robotics and computer-aided manufacturing, computer-aided engineering, artificial intelligence/software engineering, decision support systems, human factors, communications research, power systems, control systems, medical engineering, combustion diagnostics, fluid mechanics and hydraulics, environmental engineering, propulsion, soil mechanics, thermal sciences and instrumentation, thin-film development, and communications, microwaves, and lasers.

Among the special opportunities offered by the School are research institutes established for the purpose of creating opportunities for students and faculty research, strengthening ties with counterparts in government and industry, and contributing to the development and harnessing of emerging technology: Institute for Applied Space Research; Institute for Artificial Intelligence; Institute for Information Science and Technology; Institute for Magnetism Research; Institute for Management Science and Engineering; Institute for Reliability and Risk Analysis; Institute for the Study of Fatigue, Fracture, and Structural Reliability; Joint Institute for Advancement of Flight Sciences (located at the NASA-Langley Research Center in Hampton, Virginia); Institute for Medical Imaging and Image Analysis; Center for Applied Environmental Technology; National Ports and Waterways Institute.

The School also offers a comprehensive program of noncredit courses through its Continuing Engineering Education Program.

### Degree Programs

The graduate course work offered in support of the degree programs in the following list is found under the departments designated by bold type.

#### **Civil, Mechanical, and Environmental Engineering**

Aeroacoustics

Aeronautics, Astronautics, Space Systems,  
and Propulsion

Environmental and Water Resources  
Engineering

M.S., Engr., App.Sc., D.Sc.

M.S., Engr., App.Sc., D.Sc.

M.S., Engr., App.Sc., D.Sc.

Fluid Mechanics, Thermal Sciences, and Energy  
 Geotechnical Engineering  
 Mechanical Engineering Design, Computer-Aided Design, Computer-Integrated Design and Manufacturing, and Robotics  
 Ocean and Marine Engineering  
 Solid Mechanics and Materials Science  
 Structural Engineering, Structural Dynamics, and Computer-Aided Structural Design

M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc.

M.S., Engr., App.Sc., D.Sc.  
 M.S.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.

### Electrical Engineering and Computer Science

Automation and Robotics  
 Communications  
 Computer Science (Artificial Intelligence)  
 Computer Science (Hardware and Systems)  
 Computer Science (Software and Systems)  
 Electrophysics  
 Energy Conversion, Power, and Transmission  
 Medical Engineering  
 Systems Science, Networks, and Controls  
 Telecommunications and Computers

M.S.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.S.

### Engineering Management

Artificial Intelligence and Human Factors  
 Construction and Facilities Management  
 Engineering Economics  
 Engineering Management  
 Environmental and Energy Management  
 Information Management  
 Management of Research and Development  
 Manufacturing Management  
 Marketing of Technology  
 Public Works Management  
 Systems Engineering and Management  
 Transportation Management

M.S., Engr., App.Sc., D.Sc.  
 M.E.M., Engr., App.Sc., D.Sc.  
 M.S.  
 M.E.M., Engr., App.Sc., D.Sc.  
 M.E.M., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.E.M., Engr., App.Sc., D.Sc.  
 M.S.  
 M.E.M., Engr., App.Sc., D.Sc.  
 M.E.M., Engr., App.Sc., D.Sc.  
 M.S., Engr., App.Sc., D.Sc.  
 M.E.M., Engr., App.Sc., D.Sc.

### Operations Research

Defense Science  
 Energy Systems  
 General Operations Research  
 Industrial and Engineering Statistics  
 Logistics Engineering  
 Management Science  
 Manufacturing Systems  
 Mathematical Modeling in Information Systems  
 Mathematical Optimization  
 Model Building for Transportation Flows  
 Operations Research in Industrial Engineering Systems  
 Quantitative Decision Making for Public Policy  
 Stochastic Modeling

M.S.  
 M.S.  
 M.S., App.Sc.  
 M.S.  
 M.S.  
 M.S.  
 M.S.  
 M.S.  
 M.S., D.Sc.  
 M.S.  
 M.S.  
 M.S.  
 M.S., D.Sc.

### Admission

For specific entrance requirements, please see individual degree programs.

### English Language Requirements for Admission of International Students

All applicants from countries where the official language is not English must take the Test of English as a Foreign Language (TOEFL). The University looks for a minimum TOEFL score of 550 in considering candidates for admission.



All international students coming from countries where English is not an official language must take a placement test administered by the Department of English as a Foreign Language. Only those students who score 600 or higher on the TOEFL will be exempted from this requirement.

Depending on the test results, the student may be restricted in the number and type of courses that can be taken. Students assigned English as a Foreign Language (EFL) courses should anticipate additional related tuition expenses as well as a possible extended period of time required to complete their degree program.

Additional English language requirements for international students in the Department of Engineering Management are listed under Regulations, below.

### *Transfer of Credit*

Up to 6 credit hours may be accepted in transfer, when applicable, to meet degree requirements of the School, if approved by the student's advisor and department chair. The credit must have been completed with grades of A or B at another accredited and recognized institution, at a level of study equivalent to that being pursued at GW. In addition, the professional and doctoral degree programs require that the credit be earned no more than five years prior to admission to the GW program, and some departments require that it be earned more recently. Credit applied toward a previous degree may not be transferred. Transfer of credit regulations apply to courses taken as a nondegree student through GW's Division of Continuing Education.

### **Regulations**

See Fees and Financial Regulations; University Regulations.

### *Attendance*

Students may not attend classes until registration is completed. They may attend only those classes for which they are registered. Students are expected to attend all meetings of the courses in which they are registered, fully prepared to carry on the work required. Students may be dropped from any course for undue absence.

### *Grades*

The following grading system is used: A, Excellent; B Good; C, Minimum Pass; F, Fail; CR, Credit (for satisfactory thesis completion); I, Incomplete; IP, Progress; W, Authorized Withdrawal; Z, Unauthorized Withdrawal.

At the option of the instructor, the grade of I may be recorded if a student, for reasons beyond his or her control, is unable to complete the work of the course and if the instructor is informed of and approves such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded F. If acceptable reasons are later presented, the instructor may initiate an appropriate grade change. Although the grade of I may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of I cannot be removed by the student's reregistering for the course here or taking its equivalent elsewhere. An incomplete that is not removed within one calendar year is automatically changed to an F.

The symbol Z is assigned when a student is registered for a course that he or she has not attended and for which he or she has done no substantial graded work. The grade of Z will not be considered in determining the grade-point average.

**Credit/No Credit Grading System**—SEAS students may take SEAS courses under the credit/no credit grading system, but credit for such courses cannot be applied toward any degree program in SEAS.

### ***Residence and Continuous Enrollment***

All work for the degree must be done in residence unless an exception is granted by the department chair. In addition, a student in a degree program is expected to be continuously enrolled in the School until the degree is conferred. A student who breaks his or her registration must apply for readmission to the degree program under whatever conditions and regulations are in force at that time. To maintain continuous enrollment, a student may register in one of the following categories.

**Inactive Status or Leave of Absence**—This status is available to students who are awaiting graduation (with all requirements completed); attending classes at another institution (with special approval); temporarily transferred out of the area (e.g., for military TDY); or having temporary medical problems.

**Continuous Research**—Students not otherwise enrolled must register for 1 credit hour under this designation to prepare for or take the comprehensive or qualifying examination.

### ***English Language Requirements for International Students in the Department of Engineering Management***

Students from countries where English is not an official language, who are newly enrolled in any degree program offered by the Department of Engineering Management, must also take, prior to registration, the GW English as a Foreign Language placement test. The results of the test will determine whether the student must complete English as a Foreign Language (EFL) course work before enrolling in other courses.

## **Master's Degree Programs**

### ***Entrance Requirements***

Admission to study toward a master's degree requires an appropriate bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, such as may be indicated by undergraduate grades, GRE scores, and similar data. (Although GRE scores are not required for admission to SEAS, applicants are encouraged to take the examination.)

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to degree candidate status. If such deficiencies are minimal, the applicant may be admitted directly to degree candidate status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he or she is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the master's degree.

### ***General Program Requirements***

The student's program may cover a variety of fields or may concentrate in particular areas. The minimum program consists of 24 credit hours of approved graduate courses and a master's thesis (equivalent to 6 credit hours). With the approval of the department, the student may elect an optional program without a thesis that consists of a minimum of 33 credit hours of approved graduate courses. Students whose undergraduate study does not include necessary prerequisites may be required to take additional course work. All master's candidates must also pass a Master's Comprehensive Examination.



Upon admission, the student is assigned an advisor. Programs of study are determined by established prerequisites and the requirements of the department in which the student wishes to study. The program of study in preparation for the Master's Comprehensive Examination must be approved by the student's advisor and the department chair.

### *Master's Thesis*

The master's thesis, when required, must demonstrate the student's ability to make independent use of the knowledge and discipline of thought acquired through graduate study, to undertake constructive work in a given field, and to communicate the results of the work in writing. Suitable work for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

To register for the thesis course (299), the candidate must submit the thesis area to the appropriate department chair, on the form obtained from the department office and approved by the faculty advisor. At the beginning of the semester of expected graduation, the candidate must submit the thesis title to the dean, on the form available in the department office. While registered in the thesis course sequence 299-300, the student is entitled to the advice of the faculty member under whom the thesis is to be written. Students may consult with their advisors, but they have primary responsibility for the thesis.

The thesis in final form must be submitted to the department chair by the date stated in the calendar for the semester in which the candidate enrolls in thesis course 300. In the event a thesis is unfinished on the date specified, the student must register for continuous research. The overall time limit for earning the degree (see Time Limits, below) may not be exceeded. A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination committee. If the thesis is unacceptable, the student's graduate status is terminated.

Copies of detailed regulations regarding the form and reproduction of the thesis are available in the department office. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the Gelman Library, where the duplicate copies are bound and made available for circulation.

### *Master's Comprehensive Examination*

The student must pass a Master's Comprehensive Examination to demonstrate substantial understanding of principles and methods and their use in the area of interest. This examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on the first attempt may be examined once more if approval is given by the examining committee. If the student again fails to complete the examination satisfactorily, graduate status is terminated.

### *Scholarship Requirements*

A minimum grade-point average of 3.0 is required for award of a master's degree; the degree may also be awarded if a 3.0 average is earned in the required number of credits for the degree. A student who receives two grades of F or three grades below B is barred from further enrollment in graduate courses and, ordinarily, will not be readmitted as a degree candidate. A student may not repeat for credit a course in which he or she has received a grade of C or above, unless required to do so by the department chair. A written statement requiring the student to repeat such a course for credit must be submitted to the registrar by the department chair.

### *Time Limits*

A full-time student in the master's program is allowed a maximum of three calendar years (excluding the time spent taking only English as a Foreign Language courses) to complete all degree requirements, from the date of first registration as a degree candidate in prerequisite or graduate courses. A part-time student in the master's program is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to degree candidate status or any period spent on approved leave of absence. Students who do not complete degree requirements within the allowed time will have their degree candidate status terminated. They may be readmitted to degree candidate status under conditions specified by the department chair and approved by the dean.

## **Civil, Mechanical, and Environmental Engineering**

### *Entrance Requirements*

The applicant's background should normally include an undergraduate degree in engineering, the physical sciences, or applied mathematics. A grade average of B for the last two years of undergraduate study will normally be required.

Because computers have become an integral part of both education and research, the ability to use computers will be assumed in graduate courses.

### *Programs of Study*

Each program is designed to fit the student's needs, interests, and background. As part of the interdisciplinary program, students elect approved courses from other departments of the School of Engineering and Applied Science and from other schools of the University.

Some of the programs leading to the Master of Science are offered at the NASA-Langley Research Center, Hampton, Virginia. NASA-Langley's extensive scientific and engineering facilities are used whenever possible.

Programs are offered in the following fields.

**Aeroacoustics**—Required: ApSc 213; EngS 284; ME 221. Other applicable courses: ApSc 212, 215, 216; EngS 217, 257, 271, 272, 273, 274, 275, 280, 298, 299–300, 310, 311, 312, 313; ME 312. (This program is offered at NASA-Langley Research Center and is usually not offered on campus.)

**Aeronautics, Astronautics, Space Systems, and Propulsion**—Required: ApSc 213; EngS 284; ME 221. Other applicable courses: ApSc 211, 212, 214, 215, 216; EE 202, 271, 272, 273, 274, 276, 277, 278; EngS 217, 257, 258, 285, 286, 314; ME 201, 202, 203, 208, 222, 227, 231, 233, 234, 235, 237, 238, 247, 248, 249, 250, 270, 271, 272, 273, 275, 276, 277, 279, 280, 281, 287, 288, 289, 293, 295, 296, 298, 299–300, 312, 315.

**Environmental and Water Resources Engineering**—Required: CE 212, 240, 284. Other applicable courses: ApSc 211, 213, 214, 215; CE 208, 213, 214, 216, 219, 237, 241, 243, 255, 256, 272, 273, 274, 276, 277, 278, 282, 283, 298, 299–300; EngS 242, 284, 285; ME 221, 227, 231, 261, 277; OR 251, 252, 273.

**Fluid Mechanics, Thermal Sciences, and Energy**—Required: ApSc 213; EngS 284; ME 221. Other applicable courses: ApSc 211, 212, 214, 215, 216; CE 243, 274; EE 133, 236; EMgt 221, 222; EngS 208, 218, 289, 315; ME 204, 218, 225, 227, 231, 235, 237, 238, 257, 258, 259, 260, 261, 277, 280, 281, 287, 288, 289, 291, 293, 298, 299–300, 311, 312, 315, 317.

**Geotechnical Engineering**—Required: CE 206, 210, 219. Other applicable courses: ApSc 211, 212, 213; CE 201, 202, 203, 204, 205, 207, 208, 209, 213, 214,



221, 240, 255, 257, 258, 265, 282, 298, 299–300; EngS 221, 284, 285; Geol 128, 189, 224.

**Mechanical Engineering Design, Computer-Aided Design, Computer-Integrated Design and Manufacturing, and Robotics**—Required: ME 243, 251; EngS 285. Other applicable courses: ApSc 211, 212, 213; CSci 120, 131, 133, 144, 157, 174, 201, 215, 226; EE 202, 204, 271, 273; EMgt 217, 262, 270; EngS 201, 215, 221, 241, 257, 258, 259, 282, 283, 284, 285; ME 218, 240, 241, 242, 243, 245, 246, 249, 251, 252, 253, 259, 260, 286, 299–300; OR 279.

**Manufacturing Engineering**—Required: EE 276, EMgt 253, EngS 201, OR 282. Other applicable courses as listed above.

**Ocean and Marine Engineering**—Required: ApSc 213; EngS 215, 284; ME 221. Other applicable courses: ApSc 211, 212, 214, 215, 216; CE 210, 212, 253, 255, 256, 257, 271, 275, 298, 299–300; EngS 228, 257, 273, 285; ME 204, 218, 227, 231, 277, 280, 297, 312. (This program is also offered at DTRC, Carderock, Md.)

**Solid Mechanics and Materials Science**—Required: ApSc 213; EngS 218, 231 or 241. Other applicable courses: ApSc 211, 212, 214, 215, 216; CE 207, 209, 253, 254, 261, 263; EngS 215, 217, 221, 222, 229, 230, 233, 234, 236, 237, 240, 249, 256, 257, 259, 284, 285, 288, 289, 298, 299–300; ME 221, 280, 281, 295; BiSc 272; Chem 207, 211–12, 213; Phys 167, 168, 170, 211, 221–22, 224, 243, 244.

**Structural Engineering, Structural Dynamics, and Computer-Aided Structural Design**—Required: ApSc 213; EngS 215, 285. Other applicable courses: ApSc 211, 212, 214, 215, 216; CE 201, 202, 203, 204, 205, 206, 207, 208, 210, 221, 250, 251, 253, 254, 256, 257, 258, 261, 263, 266, 267, 298, 299–300; EngS 218, 221, 222, 233, 234, 240, 241, 256, 257, 259, 282, 283, 284, 388; OR 251, 252. (This program is also offered at the Carderock Division of the Naval Surface Weapons System in Bethesda, Maryland.)

## **Electrical Engineering and Computer Science**

### **Entrance Requirements**

The applicant must have a grade-point average of at least 3.0 (on a scale of 4.0), or equivalent, for the last 60 credit hours of undergraduate work and must be adequately prepared in the basic sciences (physics and either chemistry or biology) and in mathematics (four semesters beyond precalculus). Students are encouraged to submit GRE scores; those who do will be given preference in consideration for research and teaching fellowships.

The applicant must also have satisfied, through undergraduate studies, the specific prerequisites of the chosen area of concentration.

### **Programs of Study**

Each student formulates an individualized program in consultation with an assigned faculty advisor. There are no required courses or programs of study, except for automation and robotics and the computer science concentrations, which require four core courses and have specified distribution requirements (two courses in the major field and two outside it for the thesis option, four courses in and three outside the field in the nonthesis option). For all other fields offered by the department, the thesis option requires that a minimum of 12 credit hours be in the major field of concentration. For the nonthesis option, a minimum of 21 credit hours must be in the major field. A student must also select a minimum of three graduate courses outside the major area of concentration unless the student already has a graduate degree in another field. In the case of an interdisciplinary program, no courses outside the major are required, but

courses must be divided approximately equally between or among the disciplines chosen.

A maximum of three courses at the 100 level may be counted toward the requirements for the degree. The following undergraduate courses may be taken for graduate credit if they are included in the student's approved program of study: EE 126, 127, 128, 133, 144, 169, 178, 184; CSci 120, 131, 133, 140, 144, 155, 157, 174, 182, 185.

Graduate students are required to attend several department colloquia each semester. These are intended to broaden the student's professional outlook and to encourage interaction with the faculty. Schedules are posted.

Programs are offered in the following fields. Courses indicated in parentheses after prerequisites are the GW offerings in the subject; approved equivalents are acceptable.

**Automation and Robotics**—Prerequisite: Computer programming (CSci 100); discrete structures for computing (CSci 133); linear networks (EE 12); analytic mechanics (ApSc 58); probability theory (ApSc 115).

Required: EE 276, EMgt 253, EngS 201, OR 282. Other applicable courses: CSci 174, 185, 201, 220, 221, 222, 224, 226, 320, 324; EE 202, 204, 208, 213, 227, 248, 252, 262, 271, 272, 273, 275, 279, 346.

**Communications**—Prerequisite: Two courses in networks with applications using Laplace transforms (EE 11, 12); one course in electronics (EE 20); one course in communication theory (EE 143).

Applicable courses: EE 204, 205, 208, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 254, 257, 258, 259, 277, 298, 299–300, 345, 346, 347, 348, 349.

**Computer Science**—Prerequisite: Three courses in computer programming using assembly language, Pascal, and programming theory (CSci 51, 120, 144); two courses in computer hardware (CSci 140, 172); two courses in discrete mathematics and data structures (CSci 131, 133).

Required of all graduate degree candidates in computer science fields: CSci 182, 217, 232, 258. With the approval of the advisor and the department chair, core courses may be waived on the basis of previous study.

**Computer Science (Artificial Intelligence)**—Applicable courses: CSci 212, 215, 220, 221, 224, 226, 228, 298, 299–300, 320, 321, 322, 324; EE 204.

**Computer Science (Hardware and Systems)**—Applicable courses: CSci 203, 212, 231, 235, 239, 240, 243, 244, 245, 298, 299–300, 335, 337, 345; EE 126, 127, 128, 213, 214, 217, 230.

**Computer Science (Software and Systems)**—Applicable courses: CSci 215, 216, 218, 219, 222, 227, 229, 247, 255, 256, 267, 268, 270, 275, 281, 282, 298, 299–300, 319, 327, 329, 358.

**Electrophysics (Electronics, Fields, and Waves)**—Prerequisite: Two courses in networks with applications using Laplace transforms (EE 11, 12); two courses in electronics including analysis, design, and physical theory (EE 20, 121); two courses in fields and waves (EE 31, 32).

Applicable courses: EE 201, 206, 207, 221, 222, 223, 224, 225, 226, 227, 228, 232, 233, 234, 235, 236, 237, 238, 239, 255, 298, 299–300, 321, 322, 323, 329, 335.

**Energy Conversion, Power, and Transmission**—Prerequisite: Two courses in networks with applications using Laplace transforms (EE 11, 12); two courses in fields and waves (EE 31, 32); one course in electrical energy conversion (EE 177).

Applicable courses: EE 178, 202, 206, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 298, 364, 368.

**Medical Engineering**—Prerequisite: Either one course in network theory (EE 11) and two courses in electronic circuits (EE 20, 121) or one course in computer programming (CSci 100) and two courses in computer hardware and software (CSci 120, 140).



Applicable courses: EE 280, 281, 282, 283, 285, 287, 289, 298, 299–300, 381, 382, 384, 385, 386.

**Systems Science, Networks, and Controls**—Prerequisite: Three courses in networks with applications using Laplace transforms (EE 11, 12, 114); one course in electronics (EE 20); one course in control theory (EE 172).

Applicable courses: CSci 220; EE 202, 203, 204, 212, 213, 214, 215, 216, 217, 218, 219, 252, 262, 271, 272, 273, 274, 275, 279, 298, 299–300, 372.

**Telecommunications and Computers**—Prerequisite: One course in communication theory (EE 143); two courses in computer science (CSci 100 and either 120 or 172). Courses chosen for the program should be divided approximately equally between the selected disciplines.

Applicable courses: CSci 131, 133, 216, 217, 227, 229, 247, 267, 268, 329; EMgt 261, 262, 281; EE 144, 204, 205, 242, 243, 244, 246, 248, 249, 250, 251, 257, 258, 259, 346, 347, 348.

## **Engineering Management**

### **Master of Engineering Management**

#### **Entrance Requirements**

An applicant for the Master of Engineering Management program must have an undergraduate degree in engineering, natural science, or mathematics. In addition, basic knowledge of calculus, the principles of management, engineering economic analysis, and quantitative methods is required. These requirements, except for calculus, can be met by satisfactory completion of EMgt 150, 160, and 170, or approved equivalents.

A student must be accepted in a graduate program to receive credit for any graduate courses taken to satisfy degree requirements.

#### **Programs of Study**

Each student designs a program of study in consultation with the advisor. The core courses, EMgt 211–12 and 269, are required for the degree and must be taken prior to any other courses in the program. Programs are offered in the following fields.

**General Program in Engineering Management**—Required: EMgt core courses; EMgt 297 (nonthesis option) or 299–300. Electives: 15–21 credit hours chosen from the Department of Engineering Management and other departments of the University, with no more than two courses selected from other departments.

**Construction and Facilities Management**—Required: EMgt core courses; EMgt 241, 242, 261, and 297 (nonthesis option) or 299–300. Electives: 6–12 credit hours.

**Environmental and Energy Management**—Required: EMgt core courses; EMgt 221, 222, 261, and 297 (nonthesis option). Electives: 6–12 credit hours.

**Management of Research and Development**—Required: EMgt core courses; EMgt 255, 293, and 297 (nonthesis option). Electives: 9–15 credit hours.

**Marketing of Technology**—Required: EMgt core courses; EMgt 293, 294, 297 (nonthesis option) or 299–300 and 311. Electives: 6–12 credit hours.

**Public Works Management**—Required: EMgt core courses; PAd 231, 242; EMgt 297 or PAd 290. Electives: 9 credit hours chosen from engineering management and 6 credit hours chosen from public administration and/or civil engineering.

**Transportation Management**—Required: EMgt core courses; EMgt 261, 265, 266, 297 (nonthesis option) or 299–300. Electives: 6–12 credit hours.

### **Master of Science**

#### **Entrance Requirements**

Applicants must have a basic knowledge of calculus, probability and statistics, principles of management, and engineering economic analysis. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Math 51, 52; EMgt 150, 160, 170. A student must earn a grade of C or better in each undergraduate prerequisite course, and in some cases a grade of B or better may be stipulated.

#### **Programs of Study**

The following courses are required for the degree and should be taken prior to any other courses in the program: EMgt 211–12, 269. (In the systems engineering and management concentration, OR 201 is substituted for EMgt 269.)

In addition to the core courses, each student must select an area of concentration from those listed below. The student is assigned an advisor with whom a program of study is developed.

**Artificial Intelligence and Human Factors**—Required: EMgt core courses; EMgt 217, 270, 287, 290, 297 (nonthesis option) or 299–300. Electives: 3–9 credit hours.

**Engineering Economics**—Required: EMgt core courses; EMgt 261, 388, 297 (nonthesis option) or 299–300. Electives: 15 credit hours of which at least 9 must be in engineering management (nonthesis option); 9 credit hours (thesis option).

**Information Management**—Two areas of specialization are offered: software systems and applications of information systems. Only a nonthesis option is available. Required: For both specializations—EMgt core courses; EMgt 251, 297. For software systems option—CSci 131, 144, 227, 229. For applications of information systems option—EMgt 254, 256, 295, 321. Electives: Additional courses are selected, with permission of the faculty advisor, to total 33 credit hours.

**Manufacturing Management**—Only a nonthesis option is offered. Required: EMgt core courses; EE 276; EMgt 204, 253; EngS 201; OR 282. Electives: 9 credit hours.

**Systems Engineering and Management**—Only a nonthesis option is offered. Required: EMgt core courses, excluding EMgt 269; EMgt 281, 283, 287; OR 201, 202, 235; EMgt 297 or OR 291. Electives: Two courses chosen with advisor's approval.

### **Five-Year Bachelor of Arts in the Field of Economics/ Master of Science in the Field of Engineering Economics**

See the Undergraduate Programs Bulletin.

### **Operations Research**

#### **Entrance Requirements**

Applicants must have adequate knowledge of calculus, probability and statistics, and computer programming. This requirement can be met by satisfactory completion of ApSc 115 and 116, CSci 100, and Math 33, or approved equivalents. These courses can usually be taken concurrently with graduate courses;



however, with the exception of ApSc 116, the undergraduate courses do not fulfill any part of the requirements for the master's degree.

### *Programs of Study*

The core courses in the field of operations research are OR 209, 216, and 299–300 (for those electing a thesis) or 291 (for the nonthesis option). Students must complete OR 209 and 216 before enrolling in other courses; in certain cases, however, permission may be granted for concurrent registration. Students electing OR 291 normally complete this course in the last semester of study. The remainder of the program is selected, with the approval of the advisor, in an area of concentration from courses in the Department of Operations Research or other departments of the University.

Programs are offered in the following fields.

**General Operations Research**—Recommended courses: OR 251, 252, 261, 273, 277, 279. Electives: With the approval of the advisor, other courses within the department may be elected.

**Defense Science**—Recommended courses: OR 235, 236, 237, 251, 261, 262, 273, 281. Electives: With the approval of the advisor, other courses within the department may be elected.

**Energy Systems**—Recommended courses: OR 235, 236, 251, 252, 271, 277, 279. Electives: With the approval of the advisor, courses may be elected from the Department of Civil, Mechanical, and Environmental Engineering.

**Logistics Engineering**—Recommended courses: OR 235, 236, 237, 251, 253, 271, 279, 281. Electives: With the approval of the advisor, courses may be elected from the Departments of Economics, Engineering Management, Management Science, and Electrical Engineering and Computer Science.

**Mathematical Modeling in Information Systems**—Recommended courses: OR 251, 271, 273, 277. Electives: With the approval of the advisor, courses may be elected from the Departments of Electrical Engineering and Computer Science, Engineering Management, and Management Science.

**Mathematical Optimization**—Recommended courses: OR 251, 252, 253, 261. Electives: With the approval of the advisor, courses may be elected from applied science offerings and the Department of Mathematics.

**Model Building for Transportation Flows**—Recommended courses: OR 235, 236, 251, 252, 254, 273, 277, 281. Electives: With the approval of the advisor, courses may be elected from the Departments of Civil, Mechanical, and Environmental Engineering; Engineering Management; and Urban Planning and Real Estate Development.

**Operations Research in Industrial Engineering Systems**—Recommended courses: OR 237, 251, 252, 254, 271, 273, 277, 279, 281. Electives: With the approval of the advisor, other courses within the department may be elected.

**Quantitative Decision Making for Public Policy**—Recommended courses: OR 235, 236, 251, 254, 261, 271, 273. Electives: With the approval of the advisor, courses may be elected from the Departments of Civil, Mechanical, and Environmental Engineering; Economics; and Public Administration.

**Stochastic Modeling**—Recommended courses: OR 271, 273, 277, 279, 281. Electives: With the approval of the advisor, courses may be elected from the Department of Statistics/Computer and Information Systems.

**Operations Research with a Concentration in Management Science****Entrance Requirements**

Applicants must have adequate introductory knowledge of mathematics and statistics. This requirement can be met by satisfactory completion of ApSc 115 and Math 52, or approved equivalents.

**Program of Study**

Core courses required in the field of management science are EMgt 281 or 283, EMgt 287 or Mgt 224 or 226; OR 201, 202, 235, 236, and 299-300 (for those electing a thesis) or 291 (for the nonthesis option). Students electing OR 291 normally complete this course in the last semester of study. The remainder of the program is generally selected, with the approval of the advisor, from courses in the Departments of Operations Research, Engineering Management, and Economics. The following courses are recommended: EMgt 251, 253, 254, 270, 282, 295; Econ 217-18; OR 251.

**Operations Research with a Concentration in Manufacturing Systems****Entrance Requirements**

Applicants must have adequate knowledge of calculus, probability and statistics, and computer programming. This requirement can be met by satisfactory completion of ApSc 115 and 116, CSci 100, and Math 33, or approved equivalents. These courses can usually be taken concurrently with graduate courses; however, with the exception of ApSc 116, the undergraduate courses do not fulfill any part of the requirements for the master's degree.

**Program of Study**

Core courses required in the field of manufacturing systems are EE 276, EMgt 253, EngS 201, OR 209, 216, 282 and 299-300 (for those electing a thesis). The remainder of the program is selected, with the approval of the advisor, from the following: OR 251, 252, 254, 271, 273, 277, 279, 281, 291.

**Joint Master of Science in the Field of Industrial and Engineering Statistics**

See Statistics/Computer and Information Systems under Courses of Instruction.

**Five-Year Bachelor of Science (Systems Analysis and Engineering)/  
Master of Science in the Field of Operations Research**

See the Undergraduate Programs Bulletin.

**Five-Year Bachelor of Arts in the Field of Economics/  
Master of Science in the Field of Operations Research**

See the Undergraduate Programs Bulletin.

**Professional Degree Program**

The School of Engineering and Applied Science has established the professional degree program for those students who wish to pursue course work beyond the master's degree with emphasis on applied subject material rather than on basic research. Successful completion of the professional degree program leads to the degree of Engineer or of Applied Scientist.

**Entrance Requirements**

Admission to study toward the professional degree requires an appropriate master's degree from a recognized institution and evidence of capacity for pro-



ductive work in the field selected as indicated by prior scholarship and, where appropriate, professional experience. The Department of Electrical Engineering and Computer Science requires applicants for the professional degree program to have had two years of professional experience after receiving the master's degree.

To study toward the degree of Engineer, an applicant must have earned a bachelor's degree and a master's degree in an area of engineering.

To study toward the degree of Applied Scientist, an applicant must possess a bachelor's degree in engineering, mathematics, or natural science and a master's degree in engineering, natural science, mathematics, or administration. Applicants who have an equivalent quantitative background may be considered as special cases by the respective departments.

Normally, a B average in graduate work is required. However, the minimum does not assure acceptance; the departments often set higher admission standards.

Some programs have specified prerequisites. An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate and graduate courses as an unclassified student before being admitted to degree candidate status. In no case may courses thus taken fulfill any part of the requirements for the professional degree.

### **Program Requirements**

The student's program may cover a variety of fields or concentrate in particular areas. The minimum program consists of 30 credit hours of approved graduate courses beyond a master's degree. Students whose graduate study does not include necessary prerequisites may be required to take additional course work.

Programs are determined by established prerequisites and the requirements of the department in which the student wishes to study. The program of each professional degree candidate must be approved by the student's advisor and the department chair.

Each department may require its degree candidates to undertake and defend the results of a technical design project or a development problem or to prepare a comprehensive technical report to demonstrate the candidate's ability to make independent use of the knowledge and discipline of thought acquired through graduate study. When applicable, the student will be informed of this requirement by the faculty advisor at the time the student's program is being formulated. In no case, however, will this project be more than 6 credit hours out of the minimum 30.

For requirements of a specific professional degree program, please consult with the department concerned.

### **Scholarship Requirements**

If a student studying for the professional degree receives two grades of F or three grades below B, study is terminated and further enrollment prohibited. A student must have a final grade-point average of 3.0 to receive the degree. The Department of Engineering Management requires a final grade-point average of at least 3.1.

### **Time Limits**

A full-time student in the professional degree program is allowed a maximum of three calendar years to complete all degree requirements, from the date of first registration as a degree candidate in prerequisite or graduate courses. A part-time student in this program is allowed a maximum of five calendar years. The time limit does not include any period of registration as an unclassified student before admission to degree candidate status or any period spent on approved leave of absence.

Students who do not complete degree requirements within the allowed time will have their degree candidate status terminated. They may be readmitted to degree candidate status under conditions specified by the department chair.

### ***Relationship with the Doctoral Program***

Candidates for the Doctor of Science degree or professional degree who are in good academic standing may, with the approval of the faculty advisor and department chair, transfer from one degree program to the other within their department if they meet the qualifications and requirements specified by the department.

### **Doctor of Science Degree Program**

The doctoral program is designed to prepare the student for a career of creative scholarship by providing a broad but balanced background of knowledge and guidance in the performance of research. The program is divided into two stages. The first, made up of a study of related fields of learning that support the general area of research concentration, culminates in the qualifying examination. The second, composed of original research and the presentation of findings in a written dissertation, culminates in the final examination.

### **Entrance Requirements**

Admission to study toward a doctoral degree requires an appropriate master's degree from an accredited institution, completed course work designated by the department as pertinent to the field to be studied, an acceptable professional background, and a capacity for creative scholarship. Departmental requirements for the grade-point average in course work leading to the master's degree are as follows (on a scale of 4.0): Civil, Mechanical, and Environmental Engineering and Electrical Engineering and Computer Science, 3.4; Engineering Management and Operations Research, 3.5.

Although scores on the Graduate Record Examination are not required, the applicant who has taken the GRE should request that the scores be sent to the School of Engineering and Applied Science.

For admission requirements of a specific Doctor of Science degree program, please consult with the department concerned.

### **Program Requirements**

Upon admission to the first stage of the program (that is, study of related fields culminating in the qualifying examination), the student is assigned a faculty advisor who directs his or her studies. In some departments a faculty committee may be appointed instead of a single advisor. Programs of study are structured to include a major field and (with the exception of the Department of Engineering Management) two minor or supporting fields. In the Department of Civil, Mechanical, and Environmental Engineering, one of the minor fields must be in Applied Science. In the Department of Electrical Engineering and Computer Science, both minor fields may be outside the department. In the Department of Operations Research, one of the minor fields must be in a doctoral field within the department. In the Department of Engineering Management, only one minor field is required, and students are encouraged to select the field outside the department.

A minimum of 30 credit hours in a formal program at the graduate level beyond master's study is required. In many cases, particularly when the student undertakes a doctoral program in a field other than that in which the master's degree was obtained, the program of study exceeds 30 credit hours.



Students admitted to doctoral study are encouraged to undertake one year of full-time study on campus. In general, the advisor will require the student to register for a minimum of 6 credit hours of course work in every semester except the summer sessions.

To be admitted to the qualifying examination, the student must have an overall grade-point average of 3.2. If a doctoral student receives two grades of F or three grades below B, graduate study is terminated and further enrollment prohibited. The Department of Engineering Management requires a cumulative grade-point average of at least 3.4 to receive the doctoral degree.

Courses in which the student earns grades below B are not included in the total credit-hour requirement for the degree. Students who receive any grade below B are required to review their programs of study with their advisors.

### *Special Requirements*

The Department of Engineering Management requires reading knowledge of a foreign language to be demonstrated before the qualifying examination may be taken. The student must obtain the advisor's approval of the language selected. For students whose native language is not English, English will be designated as satisfying the requirement by passing an examination administered for doctoral students by the English as a Foreign Language program.

Departments may also establish a tool requirement, such as an examination in a computer language.

### *The Qualifying Examination*

The qualifying examination is the principal means of determining whether a student will qualify as a candidate for the doctoral degree and progress to the second stage of the program. Its purpose is to ascertain that the student's background and intellectual development are adequate to support doctoral research in the central field. (Some departments may administer a prequalifying examination prior to completion of the study program.)

Qualifying examinations may be written or oral, or both, and are scheduled over a period of several days. They are conducted only during the fall and spring semesters, on dates established by the departments, and are administered by a faculty committee. Upon favorable report of the examiners to the dean through the department chair, the student is admitted to candidacy for the degree; the student then begins specialized study and research under the supervision of a designated member of the faculty or, in special instances, an outstanding engineer or scientist who is not a member of the faculty.

At the discretion of the committee that prepared the examination, a student who fails any part of the qualifying examination may be given a second opportunity to qualify for candidacy. Usually, the entire examination must be retaken.

Students who fail to qualify for candidacy in a doctoral program of the School will be considered to have failed on a school-wide basis and will not be admitted to further doctoral study within the School.

### *Dissertation and Final Examination*

The student admitted to candidacy for the degree of Doctor of Science chooses the faculty member under whom he or she wishes to conduct research; the faculty member may accept or reject the request to serve as the student's director of research. The research area is approved by the director and throughout the remainder of the doctoral program the candidate conducts dissertation research under the director. However, the student may consult other members of the faculty on an informal basis. Work on the dissertation is equivalent to a minimum of 24 credit hours.

**The Dissertation**—A dissertation is required as evidence of ability to perform original scholarly research and to present and interpret the results. The student is solely responsible for the content of the dissertation.

The dissertation should embody the results of an extended original study and include material deemed worthy of publication in recognized scientific and engineering journals. The student is expected to attempt to have the results of the research published as soon as possible after he or she receives the degree and to submit copies of the published material to the dean. Credit must be given in the publication to the fact that the material is abstracted, summarized, or developed from a dissertation submitted to George Washington University in partial fulfillment of the requirements for the Doctor of Science degree.

The candidate must submit to the department five complete copies of the dissertation and an abstract (not to exceed 350 words) no later than the date specified in the calendar. The abstract is included in the announcement of the final examination and is reproduced by University Microfilms, Inc. One copy of the dissertation is also sent to University Microfilms, Inc.

Copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available in department offices. The successful candidate for the doctorate is required, before receiving the degree, to pay a fee to cover part of the expense of printing the abstract and for the basic service rendered by University Microfilms, Inc. Accepted dissertations, with accompanying drawings, become the property of the University and are deposited in the Gelman Library, where bound copies are available for circulation.

**The Final Examination**—Upon acceptance of the dissertation by the research committee, the candidate is presented for the final examination. The final examination is oral and is open to the public. The candidate must demonstrate a mastery of the special field of study and of the materials and techniques used in the research. The committee of examiners may include qualified experts brought to the University especially to participate in the examination. The director of research serves as advocate for the candidate. When the examining committee is convinced of the quality and originality of the candidate's contribution to knowledge as well as his or her mastery of the scholarship and research techniques of the field, the committee recommends the candidate for the degree of Doctor of Science. The candidate should consult the department chair about scheduling the examination.

### **Enrollment Requirements**

Full-time doctoral students must register for a minimum of 9 hours per semester until 24 hours of work have been completed beyond the qualifying examination and one hour of dissertation research (course number 399) each semester thereafter until satisfactory completion of the final examination.

Part-time doctoral students must register for a minimum of 6 hours per semester until 24 hours of work have been completed beyond the qualifying examination and one hour of dissertation research (course number 399) each semester thereafter until satisfactory completion of the final examination.

No minimum load is required during the summer sessions.

### **Time Limits**

In general, one year of study is the minimum amount of time to be spent in preparation for the qualifying examination, although the student may apply for the examination whenever he or she feels properly prepared. The qualifying examination must be completed within five years of the date of admission, and the entire degree program must usually be completed within seven years. (Full-



time students in the doctoral program in engineering management are allowed a maximum of five calendar years to complete all degree requirements.) A minimum of two years of full-time study and research should be expected in meeting the requirements for the degree. The time period for completion of the degree will be adjusted for an approved leave of absence.



## **ELLIOTT SCHOOL OF INTERNATIONAL AFFAIRS**

Dean M.A. East

Associate Deans J.R. Millar, N.J. Brown

### **Introduction**

The Elliott School of International Affairs offers graduate and undergraduate programs to prepare individuals for an increasingly international and multinational environment. The historical roots of the Elliott School can be traced back to the establishment of the School of Comparative Jurisprudence and Diplomacy in 1898. In 1966, the School separated from the School of Government, Business, and International Affairs to become an independent unit, the School of Public and International Affairs. In 1987, the name was changed to the School of International Affairs, and in 1988 the School was renamed in honor of Evelyn E. and Lloyd H. Elliott, the President of George Washington University from 1965 to 1988.

### **The Degree of Master of Arts**

The Elliott School offers degree programs leading to the Master of Arts in the fields of international affairs, European studies, international development studies, Latin American studies, East Asian studies, Russian and East European studies, security policy studies, and science, technology, and public policy.

Programs are multidisciplinary and emphasize both domestic and foreign governmental policy. Course offerings draw heavily on the various academic departments of the University. Students develop a higher level of competence in a world region or a discipline that includes a solid understanding of major historical and contemporary issues in international affairs, as preparation for professional employment in government or in international organizations, agencies, or business.

### **Admission Requirements**

Admission is normally for the fall semester only and may be for full- or part-time study. Admission to master's programs in the Elliott School is highly competitive. To be considered for admission, applicants must present a bachelor's degree from an accredited college or university. Records of academic performance, scores on the general test of the Graduate Record Examination, letters of recommendation, and a personal statement are the principal components of an application. In addition, the applicant's motivation, professional experience, and academic preparation in economics and foreign language study will be considered in the selection process.

The following additional requirements pertain to all applicants from countries in which English is not an official language—Applicants are required to

submit scores from the Test of English as a Foreign Language (TOEFL). The Test of Written English (TWE) is also recommended. The minimum TOEFL score for admission to a graduate degree program is 550. Applicants admitted as degree candidates will be required to take the English as a Foreign Language (EFL) Placement Test at George Washington University before registering. (Those who score 600 or more on the TOEFL and score 5 out of 6 on the TWE are exempted.) EFL course work may be required, depending on the applicant's performance on the placement test.

**International Affairs**—The applicant's undergraduate program should include courses in international affairs or other relevant social sciences. In the case of major deficiencies in the social sciences or international relations, additional course work may be specified beyond the minimum requirements for the master's degree.

**East Asian Studies**—An undergraduate major in a pertinent field is required. For the concentration in Chinese language and literature, the undergraduate program should include 24 credit hours of Chinese language study.

**European Studies**—An undergraduate major in a related field is required, including a good background in European history and political systems and satisfactory completion of two years of an appropriate European language and a full year course in introductory economics that includes a semester each of macro- and microeconomics.

**International Development Studies**—The new program is being established as this Bulletin is prepared for press. Please check with the Elliott School for program requirements.

**Latin American Studies**—The applicant's undergraduate program should include background course work related to Latin America. Majors in other fields may be considered for admission provided that undergraduate course work includes Spanish or Portuguese and sufficient course work in one of the following areas: anthropology, economics, geography and regional science, Hispanic literature, history, and political science.

**Russian and East European Studies**—An undergraduate major in a pertinent field is required. The undergraduate program should include the following courses, or equivalent: Hist 145, 146; PSc 131 or 168; Slav 1-2 and 3-4, or 5-6.

**Science, Technology, and Public Policy**—Undergraduate majors in a social, life, or physical science or in engineering are eligible for admission. Analytic skills and interest in policy issues with significant science or technology dimensions are more important determinants of success in the program than any particular formal training or academic background.

**Security Policy Studies**—An undergraduate background similar to that specified above for International Affairs would be appropriate. Work experience in the military or national security fields might compensate in part for inadequate academic preparation. A background in economics or quantitative analysis skills would also be helpful.

### **Readmission**

A graduate student who has not been continuously enrolled, or on approved leave of absence or inactive status, must file an application for readmission the semester before planning to return to school.

### **Regulations**

See Fees and Financial Regulations; University Regulations.



### Attendance

Students are held responsible for all of the work of the courses in which registered, and all absences must be excused by the instructor before provision is made to make up the work missed. A student suspended for any cause may not attend classes during the period of suspension.

### Withdrawal

Withdrawal without academic penalty after the end of the fifth week of classes (fall or spring semester) is permitted only in exceptional cases (see Withdrawal under University Regulations).

### General Requirements

Programs leading to the Master of Arts degree vary in their requirements. A few programs offer an option that requires a minimum of 24 credit hours of approved graduate work plus the successful completion of a thesis; the student must register for 6 hours of thesis research (IAff 299-300). Most programs require a minimum of 36 credit hours of graduate course work and may include a thesis. The Security Policy Studies program does not have a thesis option; the Chinese language and literature concentration of the East Asian Studies program requires the thesis option. In all programs, course work is taken in order to prepare for the Master's Comprehensive Examinations.

Candidates for the degree of Master of Arts are required to submit an advisor-approved plan of studies (comprehensive fields, supporting course work, tool requirement, etc.) to the office of the dean by the end of the first semester in residence. Master's degrees are awarded by vote of the faculty after the student has completed the required course work and an acceptable thesis (if one is elected), has satisfied the foreign language or tool requirement, and has passed the Master's Comprehensive Examinations.

Under special circumstances undergraduate courses numbered 101-200 may be counted toward the master's degree when registration for graduate credit has been approved at the beginning of the course by the curriculum advisor, the instructor, and the dean. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at the graduate level in addition to the regular work of the course. Normally, no more than 6 hours of undergraduate courses may be taken for graduate credit in the 30-credit-hour program, and no more than 9 hours may be taken for graduate credit in the 36-credit-hour program. (An exception to this rule is the case of students who select one or more fields in history; they may take 9 hours of 100-level courses in the 30-hour program and 12 in the 36-hour program.) No work counted toward a bachelor's degree may also be counted toward a master's degree.

All master's degree candidates must complete degree requirements within five years of their admission to the program. A student who is unable temporarily to continue the plan of studies may request a leave of absence not to exceed one year. Extensions beyond the five-year period may be granted in exceptional circumstances, but the student will be required to register and pay for 6 credit hours of Reading and Research each semester.

No credit is granted for work done in absentia or without formal instruction, except for the thesis, which may be completed in absentia with the permission of the curriculum advisor and the dean. No more than 6 hours of graduate credit may be transferred from other accredited institutions or another division of the University, and these may be accepted only under limited conditions of time, grades, and relevance to the student's program.

### **Curriculum Requirements**

Curriculum requirements for the master's programs are listed under the appropriate heading in Courses of Instruction—International Affairs; East Asian Studies; European Studies; Latin American Studies; Russian and East European Studies; Science, Technology, and Public Policy; and Security Policy Studies. Please check with the Elliott School for curriculum requirements for the new program in International Development Studies.

### **Tool Requirements**

In most degree programs, a candidate for the degree of Master of Arts must demonstrate a reading knowledge (certified by the relevant language department) of a modern foreign language that has an appropriate literature for the study of the field. Students in regional programs must demonstrate their ability in a language appropriate to the study of the specific region. If a student selects a language not offered by the University, a testing fee will be charged. A master's degree candidate whose native language is not English may select English to fulfill the requirement with the approval of the advisor and the dean. The examination, which will test high-level reading and writing proficiency, is administered by the English as a Foreign Language program.

Candidates in the fields of security policy studies and science, technology, and public policy may substitute quantitative research methods for a foreign language. This requirement may be met by demonstration of proficiency (i.e., grades of B or better) at the level of Stat 105, 112, 118, or 183, or PAd 296.

Candidates in international affairs may petition the dean to substitute statistics for a foreign language. The primary basis for approving such petitions will be the relevance of the statistical skills to the student's thesis research.

The language or tool examination should normally be taken before the student has completed the first 15 hours of work; it must be taken before the comprehensive examination. No student may take the language or tool examination more than three times. Students should consult their program guidelines for specific requirements and options concerning the tool requirement.

### **Master's Comprehensive Examinations**

In addition to course examinations, the candidate must pass written Master's Comprehensive Examinations covering the chosen fields of study. Examinations are scheduled twice a year (in November and April) and should be taken during the last semester of course work or shortly after the completion of all prescribed course work. The student must have a 3.0 grade-point average and have completed the tool requirement in order to take the Comprehensive Examinations. If there is a lapse of time between completion of course work and the examination, the student must be enrolled continuously during this period. It should be understood that course work constitutes only partial preparation for the Master's Comprehensive Examinations. Each student is expected to pursue a program of additional reading in each of the selected fields, in accordance with the advice of the faculty member responsible for instruction in that field. A student who fails to pass any part of the Master's Comprehensive Examination may, in exceptional circumstances, and with the approval of the department and the dean, repeat the examination at the next scheduled examination date. If the student fails a second time, no further opportunity to take the examination is permitted.

### **Scholarship Requirements**

Grades for graduate work are A, Excellent; B, Good; C, Minimum Pass; F, Fail; CR, Credit; I, Incomplete; IP, Progress; W, Authorized Withdrawal; and Z, Un-



authorized Withdrawal. Courses taken to satisfy degree requirements cannot be taken on a Credit (CR) basis, with exception of Thesis Research.

Graduate students are required to maintain a minimum cumulative grade-point average of 3.0. Students whose cumulative grade point average falls below 3.0 at any time after having completed at least 9 credit hours will be given an additional semester in which to raise the grade point average above 3.0. Those who fail to bring their grade point average over 3.0 at the end of the additional semester will not be allowed to continue in the program. For part-time students and those enrolled in summer sessions, a semester is interpreted to mean a time interval in which at least 9 credit hours have accrued.

A master's candidate who receives a grade of F is required to present cause for consideration by the Dean's Council as to why he or she should be allowed to continue in the program of studies.

Whenever a grade has not been assigned, the symbol I (Incomplete) or W (Authorized Withdrawal) will be recorded. The symbol I indicates that a satisfactory explanation has been given to the instructor for the student's failure to complete the required work of the course. Except for thesis research courses, an Incomplete cannot be made up after the lapse of one calendar year. An Incomplete that is not made up by the end of one calendar year remains as a grade of I on the student's record. An Incomplete cannot be removed by reregistering for the course. No student will be permitted to register for courses or take the Comprehensive Examinations if there are more than two Incompletes outstanding on the record.

A student who fails to meet the established deadlines for completion of course work or other elements of the program (e.g., comprehensive examinations) and is granted an extension may be required by the dean and the Dean's Council to register for 3 credit hours of graduate Reading and Research for each semester that the work is delinquent.

### **The Thesis**

The thesis subject should be selected as early as possible so as to permit effective integration with the course work. A student will not be permitted to register for Thesis Research (LAff 299-300) until the thesis subject has been formally submitted to the dean's office. Some programs, such as international affairs, set specific requirements in order to qualify to write a thesis. The subject must be approved by the member of the faculty under whom the thesis is to be written, a second member of the faculty who will serve as a reader, and the student's program director. The thesis in its final form must have the approval of the thesis director and one other reader, and two copies must be presented to the dean by the student no later than the date announced in the University Calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the dean's office.

Payment of tuition for thesis research entitles the candidate, during the period of registration, to the advice and direction of the thesis director and the other reader. In case a thesis is unfinished, the student must maintain continuous enrollment and is allowed one calendar year to complete it. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

### **Special Programs**

#### **Joint Master of Arts and Juris Doctor Degree Program**

The Elliott School of International Affairs cooperates with the National Law Center in offering a program of study leading to the degrees of Master of Arts and Juris Doctor. A student must be accepted for admission by both the Elliott School

and the National Law Center. Applications should be made separately but at the same time. Both the Elliott School and the Law Center should be notified that the student is interested in the combined program. The National Law Center stipulates that the first year of course work for the Juris Doctor degree must be taken as a unit; students should consult with the Assistant Dean of the Law Center for Student Affairs.

The Master of Arts degree program consists of a 36-credit-hour program that may or may not include a thesis. The student selects a degree program offered by the School and fulfills all of the requirements for the Master of Arts degree as well as fulfilling the requirements for the Juris Doctor degree.

The Law Center will accept up to six Elliott School courses (18 credit hours); the Elliott School will accept up to 12 credit hours of Law Center course work as part of this joint degree program. The program takes approximately four years of full-time study for completion.

Students will be registered in both the Elliott School and the National Law Center and must maintain this concurrent registration until all degree requirements have been completed. All work for this combined degree program must be completed in five years, unless an extension of time is granted by the respective deans.

#### **Institute for European, Russian, and Eurasian Studies**

The Institute for European, Russian, and Eurasian Studies, formerly the Institute for Sino-Soviet Studies, is a research center within the Elliott School. The Institute's research associates include University faculty members and visiting scholars in the disciplines of international affairs, political science, economics, history, geography, sociology, and relevant languages and literatures. Cross-disciplinary work is strongly encouraged. The Institute hosts numerous foreign visitors and brings ten to twelve distinguished foreign and American scholars to the University as visiting fellows each year. Institute members develop and participate in scholarly conferences, seminars and colloquia, public lectures, and research. Many are called upon to advise leaders and agencies of the U.S. government and to provide expert commentary to the media. Institute faculty play a major role in teaching graduate students in discipline-based master's and doctoral programs and in interdisciplinary master's programs. Institute faculty also administer and teach three geographic-area-based Elliott School graduate programs: European Studies, Russian and East European Studies, and East Asian Studies.

#### **Center for International Science and Technology Policy**

Originally established as the Graduate Program of Public Policy in Science and Technology, the Center for International Science and Technology Policy has become a locus for research and the exchange of information and ideas. In addition to overseeing the M.A. program in this area, the Center organizes seminars and meetings, sponsors research, and hosts visitors from elsewhere in the United States and abroad.

#### **Space Policy Institute**

The George Washington University established the Space Policy Institute as a center of objective competence in an important area of national and international activity. The Institute focuses on policy issues related to civilian space activities and their interactions with national security space programs. It conducts research on space policy issues and organizes seminars, symposia, and conferences.



**Gaston Sigur Center for East Asian Studies**

The Sigur Center was established in 1991. Its mission is to increase the quality and broaden the scope of scholarly research and publication on East Asian affairs, promote U.S.-Asian scholarly interaction, and serve as a center for educating a new generation of persons prepared to understand the rapidly expanding role of East Asia and the Pacific Rim in world affairs.



## COURSES OF INSTRUCTION

The following section provides listings and descriptions of courses offered by the departments of instruction and interdepartmental programs.

Degree requirements of departments and programs in Columbian College and Graduate School of Arts and Sciences and the Elliott School of International Affairs appear under the department or program heading; degree requirements of the Schools of Engineering and Applied Science, Education and Human Development, and Business and Public Management appear under the respective school's section.

To determine the content of required or prerequisite courses below the 200 level, see the *Undergraduate Programs Bulletin*.

The number of credit hours given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the title of the course. Thus, a year course giving 3 credit hours each semester is marked (3-3), and a semester course giving 3 credit hours is marked (3). A credit hour may be defined as one 50-minute period of class work or one laboratory period a week for one semester.

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled. The term *academic year* is used only with two-semester courses and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. Not all offerings for the summer sessions are listed in this Bulletin. Students should consult the Summer Sessions Announcement for additional summer offerings. Schedules of Classes are published for the fall/summer and spring semesters to provide information concerning the time of course offerings.

The courses as listed here are subject to change. The University reserves the right to withdraw any course announced or to change the course fees shown herein.

### Explanation of Course Numbers

**First-Group Courses**—Courses numbered 1-100 are planned for students in the freshman and sophomore years. With the approval of the advisor and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

**Second-Group Courses**—Courses numbered 101-200 are planned for students in the junior and senior years. Except for accountancy courses, they may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work to receive graduate credit. Accountancy courses numbered 101-200 may not be taken for graduate credit.

**Third-Group Courses**—Courses numbered 201-300 are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Business and Public Management registering for these courses must have a 3.0 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the dean. Non-degree students who have not completed a bachelor's degree may not enroll in graduate courses offered by the School of Business and Public Management.

**Fourth-Group Courses**—Courses numbered 301-400 in Columbian College and Graduate School of Arts and Sciences and the School of Engineering and Applied Science are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301-400 in the School of Business and Public Management are primarily for doctoral students; the courses are open to selected master's students upon approved petition. In the School of Education



and Human Development courses numbered 301-400 are limited to graduate students with master's degrees from accredited institutions.

**Fifth-Group Courses**—Courses numbered 701 and 721 represent an ongoing program of curriculum innovation at GW. The 701 number is used to designate experimental courses taught by individual faculty members. The 721 number designates innovative interdepartmental courses. The 751 number is used to list courses sponsored jointly by two or more schools. Courses numbered in the 770s are taught by scholars who hold appointments as University Professors. The 700 numbers do not indicate the level of difficulty. Courses in this series range from freshman-level offerings to classes designed for seniors and graduate students. Unless the course description in the *Schedule of Classes* indicates that there are prerequisites or that an interview with the instructor is required prior to registration, 700 courses are open to all interested students, subject to their advisor's approval and the rules of the respective schools.

### Key to Abbreviations

The following abbreviations are used for course designations:

<b>Accy</b>	Accountancy	<b>Gnet</b>	Genetics
<b>AdSc</b>	Administrative Sciences	<b>Geob</b>	Geobiology
<b>AmCv</b>	American Civilization	<b>Geog</b>	Geography and Regional Science
<b>Anat</b>	Anatomy	<b>Geol</b>	Geology
<b>Anes</b>	Anesthesiology	<b>Ger</b>	Germanic Languages and Literatures
<b>Anth</b>	Anthropology	<b>HCS</b>	Health Care Sciences
<b>ApSc</b>	Applied Science	<b>HSMP</b>	Health Services Management and Policy
<b>Art</b>	Art	<b>Hist</b>	History
<b>ArTh</b>	Art Therapy	<b>Honr</b>	Honors
<b>AM</b>	Association Management	<b>HRD</b>	Human Resource Development
<b>Bioc</b>	Biochemistry	<b>HmSc</b>	Human Sciences
<b>BiSc</b>	Biological Sciences	<b>HmSr</b>	Human Services
<b>Chem</b>	Chemistry	<b>Hmn</b>	Humanities
<b>Chin</b>	Chinese	<b>Idis</b>	Interdisciplinary Courses
<b>CE</b>	Civil Engineering	<b>IAff</b>	International Affairs
<b>Clas</b>	Classics	<b>IBus</b>	International Business
<b>CCAS</b>	Columbian College of Arts and Sciences	<b>Ital</b>	Italian
<b>Comm</b>	Communication	<b>Japn</b>	Japanese
<b>CpMd</b>	Computer Medicine	<b>Jour</b>	Journalism
<b>CSci</b>	Computer Science	<b>Kor</b>	Korean
<b>Cnsl</b>	Counseling	<b>Law</b>	Law
<b>Derm</b>	Dermatology	<b>Ling</b>	Linguistics
<b>Econ</b>	Economics	<b>Mgt</b>	Management Science
<b>Educ</b>	Educational Leadership	<b>MLOM</b>	Marketing, Logistics, and Operations Management
<b>EE</b>	Electrical Engineering	<b>Math</b>	Mathematics
<b>EMed</b>	Emergency Medicine	<b>ME</b>	Mechanical Engineering
<b>EMgt</b>	Engineering Administration	<b>Med</b>	Medicine
<b>EngS</b>	Engineering Science	<b>Micr</b>	Microbiology
<b>Engl</b>	English	<b>MStd</b>	Museum Studies
<b>EFL</b>	English as a Foreign Language	<b>Mus</b>	Music
<b>E&amp;RP</b>	Environmental and Resource Policy	<b>NSc</b>	Naval Science
<b>EnHe</b>	Environmental Health	<b>NSur</b>	Neurological Surgery
<b>Envr</b>	Environmental Studies	<b>Neur</b>	Neurology
<b>EMBA</b>	Executive Master of Business Administration	<b>NeuS</b>	Neuroscience
<b>ExSA</b>	Exercise and Sport Activities	<b>Ob&amp;G</b>	Obstetrics and Gynecology
<b>ExSc</b>	Exercise Science	<b>OR</b>	Operations Research
<b>Fina</b>	Finance	<b>Opht</b>	Ophthalmology
<b>ForS</b>	Forensic Sciences	<b>Orth</b>	Orthopaedic Surgery
<b>Fren</b>	French		

<b>Path</b>	Pathology	<b>SLP</b>	Service-Learning Program
<b>PStd</b>	Peace Studies	<b>Slav</b>	Slavic Languages and Literatures
<b>Peds</b>	Pediatrics	<b>Soc</b>	Sociology
<b>Phar</b>	Pharmacology	<b>Span</b>	Spanish
<b>Phil</b>	Philosophy	<b>SpEd</b>	Special Education
<b>Phys</b>	Physics	<b>SpHr</b>	Speech and Hearing
<b>Phyl</b>	Physiology	<b>Stat</b>	Statistics/Computer and Information Systems
<b>PCm</b>	Political Communication	<b>SMPP</b>	Strategic Management and Public Policy
<b>PPsy</b>	Political Psychology	<b>Surg</b>	Surgery
<b>PSc</b>	Political Science	<b>TrEd</b>	Teacher Education
<b>Port</b>	Portuguese	<b>TCom</b>	Telecommunication
<b>Pchi</b>	Psychiatry and Behavioral Sciences	<b>TrDa</b>	Theatre and Dance
<b>Psyc</b>	Psychology	<b>TrSt</b>	Tourism Studies
<b>PAd</b>	Public Administration	<b>Univ</b>	University
<b>PubH</b>	Public Health	<b>Urol</b>	Urology
<b>PPol</b>	Public Policy	<b>WStu</b>	Women's Studies
<b>Rad</b>	Radiology		
<b>Rel</b>	Religion		
<b>Rom</b>	Romance Literatures		

## ACCOUNTANCY

Professors A.J. Mastro, C.M. Paik, M.G. Gallagher, J. Hilmy, F.W. Segel, D.R. Sheldon (Chair), W.R. Baber, F.D. Fowler, R.G. Stevens (Visiting)  
 Associate Professors L.G. Singleton, K.E. Smith, L.C. Moersen  
 Assistant Professors S.M. Moody, T. Verghese, K.R. Kumar

See the School of Business and Public Management for programs of study in accountancy leading to the degrees of Master of Accountancy, Master of Taxation, and Doctor of Philosophy.

- 201 Financial Accounting (3)** Singleton, Sheldon  
 The role of accounting in the decision-making process of external parties; the understanding, interpretation, and implementation of financial accounting. (Course equivalent: a similar graduate financial accounting course, or Accy 51-52, or two similar undergraduate courses.) (Fall and spring)
- 202 Management Accounting (3)** Paik, Moody  
 The role of accounting in the decision-making processes of management; understanding of how accounting influences resource allocation decisions in the organization. Prerequisite: Accy 201. (Fall and spring)
- 211 Business Law for Accountants (3)** Moersen  
 A study of the legal process and the principles and precepts of business law within the context of the political and legal environment of business. Corporations, partnerships, securities, the debtor-creditor relationship, property, and the legal liability and ethical standards of the accountant. (Fall and spring)
- 221 Cost and Budget Analysis (3)** Moody, Paik  
 An advanced cost analysis course, with emphasis on comparative costs, quantitative techniques for cost data, managerial reporting systems, and manufacturing efficiency studies. Prerequisite: Accy 201 and 202. (Spring)
- 225 Financial Reporting Standards (3)** Sheldon  
 A critical understanding of the Financial Accounting Standards Board Pronouncements (Standards) and professional standards for computation of financial statements. Analysis of alternative accounting treatments by management in financial reporting. Prerequisite: Accy 201. (Fall and spring)
- 232 Accounting Theory (3)** Segel, Hilmy  
 Alternative approaches to structuring a financial accounting theory and analysis of the various theoretical interpretations espoused in the process of formulating accounting standards. Prerequisite: Accy 225 or permission of the instructor. (Spring)



- 242 Business Income Taxation (3)** Gallagher  
Federal tax concepts applicable to individuals, partnerships, fiduciaries, and corporations; emphasis on recognition of tax consequences attached to common business transactions and on tax planning. Not open to Master of Accountancy or Master of Taxation candidates. (Fall and spring)
- 251 Accounting for Multinational Corporations (3)** Hilmy  
A study of international accounting standards with emphasis on accounting for foreign conversion requirements compatible with domestic accounting consolidation standards. Prerequisite: Accy 201. (Fall and spring)
- 255 Business Combinations and Not-for-Profit Organizations (3)** Hilmy  
Corporate concepts, business combination policies, including FASB, SEC, AICPA business combination pronouncements. Structure analysis of combined and consolidated financial statements; accounting for not-for-profit and governmental organizations. Prerequisite or (with approval of instructor) concurrent registration: Accy 225. (Fall)
- 261 Federal Income Taxation (3)** Gallagher  
A study of federal income taxation, covering gross income, deductions and credits, sales and other disposition of property, capital gains and losses, and timing. (Fall and spring)
- 262 Federal Income Taxation of Partnerships (3)** Smith  
Federal income taxation of partnerships; formation and operation, distribution to partners, liquidation, and transfer of partnership interests. 5 corporations are considered. Prerequisite: Accy 242 or 261. (Spring)
- 263 Federal Income Taxation of Corporations (3)** Gallagher  
Federal income taxation of C and S corporations, covering formation, capital structure, nonliquidating distributions, complete liquidations, corporate accumulations, and the alternative minimum tax. Prerequisite or concurrent registration: Accy 242 or 261. (Fall and spring)
- 264 Federal Taxation of Estates and Gifts (3)** Smith  
An introduction to the federal taxation of wealth transfers and the income taxation of estates and trusts. Topics include assets that comprise the gross estate, deductions, valuation and liquidity problems, and estate planning. Prerequisite: Accy 242 or 261. (Spring)
- 265 Tax Practice and Procedure (3)** Smith  
A study of federal tax practice and procedure, including organization of the IRS, ethical responsibilities, statute of limitations, examination of returns, claims for refund, penalties, and tax rulings. Prerequisite or concurrent registration: Accy 261. (Fall)
- 266 Corporate Reorganizations and Affiliations (3)** Smith  
Advanced study of corporate taxation: corporate reorganizations, multiple corporations, consolidated returns, and carryover of tax attributes. Prerequisite: Accy 263. (Spring)
- 267 International Taxation (3)** Gallagher  
A comparative analysis of the tax policies of countries that play a significant role in the international trading system. Prerequisite: Accy 201. (Spring)
- 268 Deferred Compensation (3)** Gallagher, Smith  
A study of tax aspects of deferred compensation arrangements, including qualified pension, profit-sharing, and stock bonus plans; retirement plans for self-employed individuals; individual retirement accounts; and stock options. Prerequisite or concurrent registration: Accy 261. (Spring)
- 269 Tax Research and Planning (3)** Smith  
A study of the legislative, administrative, and judicial sources of federal tax law. Emphasis on the use of tax research tools in locating, interpreting, and communicating tax law and on the complementary relationship between legal research and quantitative decision making. Prerequisite or concurrent registration: Accy 261. (Fall)
- 275 Contemporary Auditing Theory (3)** Stevens  
Study of advanced independent (external) and internal auditing concepts: operational auditing, application of statistical sampling to auditing, audit of electronic data processing systems, computer applications, ethics. Prerequisite: Accy 225. (Spring)

- 282 **Accounting Information Systems and EDP** (3) Verghese  
Development and application of accounting system theory, including analysis, design, control concepts, and implementation. Integration of electronic data processing, accounting systems, and management information systems. Prerequisite: Accy 201. (Fall)
- 290 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit. (Fall and spring)
- 291 **Financial Statement Analysis** (3) Hilmy, Stevens  
Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors; establishing firms' business profiles; balance-sheet restructuring and the identification of financial and accounting correction measures from financial statements. Prerequisite: Accy 201. (Fall and Spring)
- 297 **Professional Accountancy and Business/Government Policy** (3) Mastro  
A study of the development process of professional accounting standards through examination of the socioeconomic, political, legal, and management process. Management policy concerns for alternatives in the selection of accounting standards. Prerequisite: Master of Accountancy or Master of Taxation status. (Fall and spring)
- 298 **Directed Readings and Research** (3) Staff
- 311 **Seminar: Public-Private Sector Institutions and Relationships** (3) Staff  
Same as SMPP 311.
- 391 **Doctoral Seminar** (arr.) Baber, Paik  
Reasoning and research in technical areas of accounting; theoretical issues and their application to practice; conceptual themes in professional literature; comparative accounting research analyses. (Fall and spring)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to doctoral candidates. May be repeated for credit.

## ADMINISTRATIVE SCIENCES

Professors J. Zeidner (Director), E. Cherian

Professorial Lecturers J. Baker, H. Eskew, O. Jacobs, E. Johnson, R. Sadacca, M. Sashkin, D. Harris, T. Richards, L. Broedling, J. Morris, M. Roberts, J. Sharf

Associate Professors V. Campbell (Visiting), G.P. Learmonth, Jr., N.M. Dixon, W.H. Money

Associate Professorial Lecturers R. Belous, J. Georgatos, B. Kutnick, T. Rosen, L. Tanner, J. Hanson, W. Camara, S. Wehrenberg

Assistant Professor A. Martin (Visiting)

Assistant Professorial Lecturers M. Rumberg, P. Gardner, J. Saunders, S. Ross

Instructor E. Bailey

Columbian College and Graduate School of Arts and Sciences offers interdepartmental administrative sciences programs leading to the degrees of Master of Arts and Master of Science in several fields. The programs have been designed for public and private sector professionals who wish to increase their managerial competence and to improve their career potential. The curricula provide knowledge and skills in the social, behavioral, quantitative, and information sciences.

**Master of Arts in the field of human resources management**—Prerequisite: a bachelor's degree with a B average from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including 36 credit hours of course work. There is no thesis requirement. All students must pass a Master's Comprehensive Examination. The following courses are required: AdSc 209, 212, 213, 214, 220, 221, 222, 223, 248; Econ 219, Psyc 244; Stat 104.

**Master of Arts in the field of organizational management**—Prerequisite: a bachelor's degree with a B average from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including 36 credit hours of course work. There is no thesis



requirement. All students must pass a Master's Comprehensive Examination. The following courses are required: AdSc 209, 216, 217, 221, 241, 242, 243; Econ 219; Psyc 245, 246, 259; Stat 104.

*Master of Science in the field of management information systems*—Prerequisite: a bachelor's degree with a B average from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including 36 credit hours of course work. There is no thesis requirement. All students must pass a Master's Comprehensive Examination. The following courses are required: AdSc 209; Econ 217; OR 233; Psyc 244; Stat 104; seven of the following courses, chosen with faculty approval: AdSc 201, 202, 203, 205, 206, 207, 208, 219, 225.

**Note:** For the Executive Master of Science in the field of information systems, see the program listed under Virginia Campus.

**201 Principles of Management Information Systems (3)**

An overview of the management information systems specialty track. Integration of management, information, and systems concepts into a unified framework. Management information systems development, design, implementation, and evaluation strategies.

**202 Database Management and Operating Systems (3)**

Fundamental concepts of operating systems and database management systems that serve as the foundation for information system design and development. Dynamic storage management, virtual memory process management, control languages, and systems routines. Prerequisite: AdSc 201 and the administrative sciences core curriculum except OR 233.

**203 Data Communications and Networking (3)**

Advanced concepts in analysis and development of information systems. Distributed data processing techniques and local area network design; development of telecommunication procedures. Implementation strategies used in the design of management decision-making systems. Prerequisite: AdSc 201 and the administrative sciences core curriculum except OR 233.

**205 Decision Support Systems (3)**

Analysis of frameworks, techniques, and tools for assisting management in the decision-making process. Hardware and software limitations of alternative approaches; anticipated technological improvements. Computer-based decision-making aids and simulations. Effective implementation of decision support systems. Prerequisite: AdSc 202, 203; OR 233.

**206 Artificial Intelligence and Expert Systems (3)**

Principles of artificial intelligence, including applications in robotics, natural language programs, and advanced computer input-output devices. Analysis of various expert systems, including tools and generators, classification vs. diagnostic type systems. Development of the knowledge base and role of the knowledge engineer. Prerequisite: AdSc 202 and 203.

**207 Information Systems Design (3)**

Introduction to the design and analysis of information systems. The systems development life cycle, analysis of requirements, design of logical systems, analysis and design of user interfaces, system documentation and specifications. Planning for system implementation, evaluation, and maintenance. Prerequisite: AdSc 205.

**208 Principles of Information Resource Management (3)**

Basic principles of information resource management, including the use and impact of information in organizations; the relationships among information, knowledge, and management; end-user development of information systems; management of technology in an information economy. Prerequisite: AdSc 202, 203.

**209 Management Systems (3)**

An overview of management systems using the systems approach to management and problem solving; understanding long-range planning; management of complex projects using computer systems; use of work breakdown structures; critical-path planning systems and network analysis; cost-effectiveness analysis; program evaluation.

- 211 Psychology of Personnel Management (3)**  
An overview of the human resources management, examining a unified human resources management program, including integration of human resources planning, job analysis, employee selection, placement, training, performance evaluation, compensation management, and management information systems. Psychological theories underlying major personnel systems.
- 212 Current Issues in Personnel Testing and Selection (3)**  
Psychometric, legal, and organizational issues in personnel employment testing and selection, reliability and validity of selection instruments, and the utility of selection systems. The legal environment, including test fairness in selection, adverse impact, and statistical models of test fairness and specific selection techniques. Prerequisite: Stat 104.
- 213 Managerial Leadership, Motivation, and Work (3)**  
Analysis of leadership behavior and managerial activities. Synthesis of major theories of leadership, including trait, behavior, situational, and power-influence. Synthesis of motivational theories, including cognitive and cognitive perspectives. Application of theories at various levels of formal organizations beyond the interpersonal perspective.
- 214 Personnel Training and Performance Appraisal Systems (3)**  
Management training programs and training evaluation techniques. Performance appraisal techniques, appraisal systems, relationship of rewards to performance, and the appraisal interview. Training and rating systems that satisfy legal requirements and stimulate employee productivity.
- 215 Current Issues in Organizational Design (3)**  
Analytical framework for the design of complex organizations, including the hierarchical bureaucratic, functional, and matrix structures. Examination of organizational technologies, control and boundaries, including design approaches emanating from Europe, Japan, and the United States, drawing on system theory and moving toward broader organizational design issues.
- 216 Theories and Management of Planned Change (3)**  
A systems view of organizational change and development, including intervention strategies, data collection diagnosis, and the integration and management of system-wide organizational change.
- 217 Productivity and Human Performance (3)**  
Definitions and measurement of individual, team, and organizational productivity, effectiveness, and efficiency. Models for the analysis of organizational and individual productivity and productivity growth in industrialized nations. Techniques for increasing productivity.
- 218 Design of User-Computer Interface (3)**  
Study of user-computer interaction. The theoretical bases of user-computer interaction and the integration of research findings into guidelines for systems developers and users. Environmental factors, user variables, help functions, system design, and multiple users. Prerequisite: AdSc 201; degree candidacy or permission of instructor.
- 219 Information Security and Policy (3)**  
Computer fraud and countermeasures for computer system security. Data privacy, ethics in database management, information access policy, data security, contracts. Transborder data flow, technology transfer, electronic funds transfer systems, computer infringement of copyright, and protection of property rights in software. Prerequisite: AdSc 202, 203.
- 220 Organizational Decision Making (3)**  
Examination of processes in organizational decision making; the state of theory; research and applications for the practicing manager. Topics include managerial style and decision making, problem discovery and diagnosis, search for the design of solution, evaluation and choice, group decision making, decision aids and support systems, and risk analysis.
- 221 Introduction to Computers, Programming, and Information Systems (3)**  
Computer architecture, hardware, and software in management information systems. Information systems principles, including data processing applications, data communications, database management, and operating systems. Program structures, structured modularization, structured programming concepts; step-wise refinement and top-down programming.



- 222 Theory and Practice of Compensation Management (3)**  
Analysis of contemporary compensation systems from both theoretical and practical perspectives, including the latest decisions of courts and regulatory agencies. Examination of motivational theories of pay, determinants and effects of salary structures on performance, incentive plans, performance-based compensation, and managerial compensation systems. Prerequisite: AdSc 214.
- 223 Collective Bargaining (3)**  
Analysis of federal and state employee relations laws and regulations. Topics include the bargaining environment, wage and benefit issues in arbitration, arbitration of grievances, and employee relations in non-union organizations. Behavioral theories of labor negotiations. Prerequisite: AdSc 222.
- 225 Management Information Systems Development (3)**  
The capstone course of the management information systems track. Individual and team working experience in the actual design, development, implementation, and evaluation of a management information system. Emphasis on needs assessment, organizational structures, user manuals, and documentation. Prerequisite: AdSc 205, 206, 219.
- 240 Corporate Policy and Social Responsibility (3)**  
Examination of the process of policy analysis, development, and implementation. Analysis of policy mechanisms, including technology assessment, research and development, regulatory and control mechanisms. Illustrative examples of policy issues and problems drawn from government and industry, covering a broad range of substantive areas.
- 241 Strategic Management and Policy Formation (3)**  
Processes and theories of strategic management in the profit and not-for-profit sectors. Analysis of behavioral, sociopolitical, and economic forces underlying strategy formulation. Issues of strategic competitive advantage; corporate diversification; multinational corporations; evaluation and choice; and implementation of functional and corporate strategies.
- 242 Organizational Communication and Conflict Management (3)**  
Theories and models of communications and communication media; barriers to effective communication and techniques for improving interpersonal, group, and organizational communications. Sources of conflict in organizations at the individual, group, and organizational level; methods of conflict management and resolution.
- 243 Seminar: Leadership in Complex Organizations (3)**  
The view of leadership taken in this seminar extends theories beyond the interpersonal, near-immediate time frame toward an organizational perspective in which cause-and-effect linkages are traced. The leadership role as an attribute of a system. How effective leaders reduce uncertainty through appropriate adaptive change.
- 246 Comparative Management (3)**  
International dimensions of management over a broad spectrum of topics, including cross-national transfer and management practices in a global economy; cross-cultural interaction; business-government relations; expatriation and repatriation processes; international strategic management; technology transfer; globalization of human resources management.
- 248 Strategic Human Resource Planning (3)**  
Overview of the principles of human resource planning. Model for determining human resource requirements, including forecasting, goal setting, human resource auditing, and environmental scanning. Analysis of the interfaces between human resource planning and personnel selection, job design, training, compensation, and related functions.
- 249 Human Resource Information Systems (3)**  
Analysis of information systems designed to support planning, administration, decision making, and control activities of human resource management. Examination of applications such as personnel selection and performance appraisal systems, payroll and benefit management, and career pathing. Prerequisite: AdSc 212, 221, 222, or permission of instructor.
- 295 Directed Research (arr.)**  
Supervised research in selected fields within administrative sciences. Admission by prior permission of faculty advisor and instructor.

**297 Special Topics (3)**

Staff

Special topics in management information systems technology; human resource strategic planning, computer-based learning, human-computer interaction, and organizational design. Prerequisite: AdSc 201 or 211 or Psyc 245.

**298 Directed Readings (arr.)**

Supervised readings in selected fields within administrative sciences. Admission by prior permission of faculty advisor and instructor.

**299-300 Thesis Research (3-3)****AMERICAN STUDIES**

Professors R.H. Walker, Jr., C.C. Mondale (Emeritus), B.M. Mergen, H.F. Gillette, Jr., J.M. Vlach (Director), J.O. Horton  
 Professorial Lecturers L. Miller, W.E. Washburn  
 Associate Professors R.W. Longstreth, P.M. Palmer, T.A. Murphy  
 Adjunct Associate Professor P.J. Cressey  
 Associate Professorial Lecturers B.G. Carson, G. Kulik

**Graduate Committee**

W.H. Becker, H.F. Gillette, Jr., J.O. Horton, R.W. Longstreth, B.M. Mergen, C.C. Mondale, T.A. Murphy, P.M. Palmer, L.P. Ribuffo, C.W. Sten, J.M. Vlach, D.D. Wallace, Jr., R.H. Walker

*Master of Arts in the field of American civilization*—Prerequisite: the degree of Bachelor of Arts in American civilization or a related field.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including (1) AmCv 271-72; (2) 18 credit hours chosen in a carefully related pattern of study of American civilization; (3) a comprehensive examination covering general competence in American civilization and the candidate's area of concentration; (4) a thesis (6 credit hours) written on a topic approved by the student's advisor or, with permission of the advisor and the director of the program, 12 credit hours of additional course work, 6 of which must be research oriented. Special options in the master's degree program include the following.

1. *A concentration in museums and material culture*—Course emphasis on the use of artifacts in historical research, offered in association with the Smithsonian Institution. Required in addition to the general requirements outlined above: AmCv 250. Recommended: courses in decorative arts, architectural history, historical archaeology, history of technology, history of art, and folklife. Programs specific to museum studies and museum education are also available.

2. *A concentration in historic preservation*—Course emphasis on interpreting issues in historic preservation through a humanistic framework. Prerequisite: a course in American architectural history. For this concentration, the general requirements outlined above are amended as follows. Required: 36 credit hours, consisting of 12 hours of American civilization courses including AmCv 271-72; 18 hours of historic preservation courses including AmCv 277-78; a thesis (6 hours). A comprehensive examination, as outlined above, is required.

3. *A concentration in folklife*—Course emphasis on the expressive culture of American folk societies and theories and methods for their evaluation and interpretation. Required in addition to the general requirements outlined above: AmCv 254, 257. Recommended: courses in topics related to folklife, such as regionalism, oral history, material culture, vernacular architecture, and social and cultural history.

*Doctor of Philosophy in the field of American civilization*—This program combines work in the humanities and/or social sciences as preparation for research and teaching, with the option of stressing preparation for museum careers. Applicants are required to have an adequate background in the humanities and/or social sciences as they apply to the understanding of American civilization.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences and successful completion of a reading knowledge examination in an approved foreign language. Candidates must pass a General Examination in four areas within three calendar years of matriculation. American cultural history is a required field. Three other fields are elected with approval of the advisory committee; one field must represent foreign coverage. Other areas may be chosen from American diplomatic, eco-



conomic, political, social, or urban history; folklife, literature, art, philosophy, or religion; Afro-American history; historic preservation; or some areas of the social and behavioral sciences. In affiliation with the Smithsonian Institution, possible topics include aerospace history, decorative arts, ethnohistory, history of science, history of technology, industrial archaeology, material aspects of American civilization, and various fields in the history of art. Additional areas of study may be arranged within the University and in both the Library of Congress and the Smithsonian. Special announcements concerning these programs are issued periodically and are available in the office of the Director of the American Studies Program.

Research fields for the dissertation may be chosen from any of the above except those dealing with the culture of an area outside the United States.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 220 **Historical Feminist Theory** (3) Palmer  
Same as WStu 220.
- 225 **History of Washington, D.C.** (3) Gillette  
The social history of Washington, from village to metropolis, with emphasis through field trips on the evolution of residential neighborhoods and related issues of historic preservation and conservation. Same as Hist 225. (Spring)
- 254 **Folklore Theory** (3) Vlach  
An intellectual history of American folklore research; analysis of particular theories and methods. Same as Anth 254. (Spring)
- 255-56 **Research Orientation Seminar: Americana Collections** (3-3) Staff  
Examination of major themes in American civilization as they relate to the collections in major Washington-area libraries. Full-year course with direct exposure to Library staff and materials. May be taken either as a conventional seminar culminating in a research paper or as preparation for a doctoral reading field. (Alternate academic years)
- 257 **Seminar: American Folklife** (3) Vlach  
Research and discussion on the traditional cultures of various geographical regions of the United States. Analysis of folk art, craft, and architecture; regional and ethnic identities. Same as Anth 257. (Fall)
- 260 **Women and Work in the United States** (3) Haber, Palmer  
Same as WStu 260 and Econ 141.
- 271-72 **Seminar: Scope and Methods in American Studies** (3-3) Murphy  
Consideration of American studies as an area for research and teaching; introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American civilization. (Academic year)
- 273 **Studies in Early American Culture** (3) Seavey  
Same as Engl/Hist 273.
- 275 **The Politics of Historic Preservation** (3) Staff  
Overview of the political issues, forces, events, and players that have shaped contemporary preservation practice, with an emphasis on public policy issues that have not been resolved and continue to confront preservation objectives. Prerequisite: Permission of instructor. (Spring)
- 276 **Economics of Preservation** (3) Wagner  
Analysis of economic techniques and benefits used to encourage the retention and reuse of historic buildings and districts in the United States. Emphasis on revitalization of older commercial centers and the Mainstreet program. Prerequisite: Permission of instructor. (Spring)
- 277-78 **Historic Preservation: Principles and Methods** (3-3) Longstreth  
The scope and purpose of the preservation movement in the United States, with focus on developments since the 1960s. Preservation theories, attitudes toward the past and toward design, the intent and impact of legislation, approaches to documentation, the concept of significance, and preservation as an instrument of change. Same as Hist 277-78. (Academic year)
- 282 **Seminar in American Architecture** (3) Longstreth  
Advanced research problems addressing artistic, cultural, social, technical, and urbanistic aspects of American architecture in the 19th and 20th centuries.

Topics vary. Prerequisite: AmCv 175 or 176 or equivalent, or permission of instructor. (Spring, alternate years)

- 286 **Interpretation in the Historic House Museum** (3) Stapp  
Same as Educ 286.
- 289-90 **Seminar: Topics in American Civilization** (3-3) Staff  
Research problems selected by the instructor. Preparation in American cultural history or other area appropriate to the topic of the seminar. (Academic year)
- 294 **Archaeology Field/Laboratory Research** (3) Cressey, Brooks  
Same as Anth 294.
- 295 **Independent Study** (arr.) Staff  
Limited to master's candidates. Written permission of instructor required.
- 299-300 **Thesis Research** (3-3) Staff
- 351 **Vernacular Architecture** (3) Vlach  
Examination of selected regional and ethnic traditions in American building. Survey and field techniques, comparative study of related types of objects, and use of documentary sources. (Spring)
- 355-56 **Practicum: Advanced Library Research** (3-3) Staff  
Practical problems in control of library materials with emphasis on collections in major area libraries. Prerequisite: AmCv 255-56. (Academic year)
- 379-80 **Readings in American Cultural History** (3-3) Mergen, Gillette  
For students preparing for the Doctor of Philosophy general examination in the field of American cultural history. (Academic year)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

#### Courses Offered in Affiliation with the Smithsonian Institution

Columbian College and Graduate School of Arts and Sciences is affiliated with the Smithsonian Institution's Program for Graduate Students in the History of American Civilization. The following courses are offered at the National Museum of American History and at the National Portrait Gallery by members of their staffs.

- 250 **American Material Culture** (3) Washburn, Mergen  
Familiarization with the historical collections of the Smithsonian Institution and introduction to opportunities for research and publication based on historical objects. Required of all students in the master's and doctoral programs affiliated with the Smithsonian Institution. (Fall)
- 251 **Museum Research and Education** (3) Washburn and Staff  
Supervised work and or study under the direction of Smithsonian staff members and research associates—museum visitor behavior, costumes and furnishings, decorative arts, and photography as historical documentation. (Fall and spring)
- 252-53 **American Decorative Arts** (3-3) Carson  
Concepts of visual recognition and evaluation of surviving domestic artifacts from the 17th, 18th, and 19th centuries, including those made of wood, clay, glass, metal, and cloth. AmCv 252 is prerequisite to AmCv 253. (Academic year)
- 284 **Seminar: Studies in American Art and History** (3) Miller  
Joint offering of the American Studies Program and the Art Department. Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. May be repeated for credit.
- 285 **Technology, Labor, and American Society** (3) Kulik, Mergen  
Selected readings on the interrelations among technology, labor, and society in the United States.
- 352 **Research in Aspects of American Civilization** (3)  
Supervised study and or fieldwork in selected subject areas related to the activities of the Smithsonian Institution. (Fall or spring)



**394 Advanced Reading and Research (arr.)**

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit.

**395 Dissertation Research (arr.)**

For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. May be repeated for credit.

**ANATOMY**

Professors M.J. Koering, K.E. Johnson, J.M. Rosenstein, K.D. Peusner, R.J. Walsh (Interim Chair)

Associate Professors F.J. Slaby, R.C. Bohn, S.A. Moody

Assistant Professors J.M. Krum (Research), S. Huang (Research)

*Doctor of Philosophy in the field of anatomy*—Required: The general requirements stated under Columbian College and Graduate School of Arts and Sciences. Candidates must demonstrate proficiency in biostatistics and computer science. There will be a comprehensive written and oral examination that will cover at least three areas of anatomical studies.

Research fields: Neurobiology, embryology, and reproductive biology.

Faculty approval is required for all courses.

**202 Gross Anatomy (6)**

Slaby, Bohn

Regional dissections of adult cadaver supplemented with lectures and x-rays. Laboratory fee, \$30. (Fall)

**204 Neuroanatomy (2)**

Peusner

Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, \$13.

**205 Human Microscopic Anatomy (4)**

Koering and Staff

Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, \$20. (Fall)

**212 Neurobiology (3)**

Peusner and Staff

An integrated survey of the structure and function of the human nervous system: lecture, clinical demonstration, and laboratory. Same as Phyl 212. Laboratory fee, \$25.

**221-22 Seminar (1-1)**

Bohn

Research reports and discussions of special topics by guest lecturers, staff, and students. (Academic year)

**249 Introduction to Anatomical Research (1)**

Staff

Major research techniques as applied to biological materials in the various anatomical disciplines. (Fall)

**252 Physical Anthropology (1)**

Ubelaker

Variations in humans and factors affecting them; human evolution and racial differences; anatomy and culture of ancient humans. (Spring)

**253 Brain-Tissue Interactions (1)**

Walsh, Rosenstein

Interactions of the central nervous system with the muscular, sensory, and endocrine systems. Student presentations and clinical aspects. Prerequisite: Anat/Phyl 212. (Spring)

**254 Fetal Anatomy (2)**

Staff

Dissection of midgestational fetus. Comparison of fetal and adult structures. Limited enrollment. Laboratory fee, \$10. (Spring)

**256 Teratology (1)**

Staff

Introduction to teratologic principles and techniques, with emphasis on experimental design. Limited enrollment.

**260 Electron Microscopy in Cellular Biology—Lecture (1)**

Koering

Introduction to the morphology of the cell and its relationship to electron microscopic techniques. (Spring)

**261 Electron Microscopy (4)**

Koering

Introduction to the routine processing of specimens; preparation and interpretation of micrographs. Limited enrollment. Admission by permission of instructor. Prerequisite or concurrent registration: Anat 260. Laboratory fee, \$25. (Spring)

- 262 **Gross Anatomy of Upper and Lower Extremities (2)** Slaby  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring)
- 264 **Gross Anatomy of Head and Neck (2)** Staff  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring)
- 266 **Gross Anatomy of Thorax and Abdomen (2)** Staff  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring)
- 266 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity (2)** Staff  
Detailed dissection, supplemented by x-ray anatomy; discussions, assigned reading. Limited enrollment. Laboratory fee, \$10. (Spring)
- 276 **Advanced Studies in Anatomy (1)** Staff  
Lectures and conferences on selected anatomical subspecialties—endocrinology, teratology, growth, and others. May be repeated for credit. (Spring)
- 277 **Special Topics in Neuroanatomy (3)** Bohn, Peusner, Rosenstein, Walsh  
Selected topics regarding the structural and functional organization of the nervous system. May be repeated for credit. (Spring—alternate years)
- 288 **Surface Anatomy and Radiology (1)** Slaby  
Lectures on areas of clinical importance. (Spring)
- 289 **Biochemical and Morphological Techniques in Cell Biology (3)** Slaby  
The application of biochemical and electron micrographic techniques used in cell biology research. Limited enrollment.
- 295 **Research (arr.)** Staff  
Content differs each time course is offered; may be repeated once for credit. Fee to be arranged. (Fall and spring)
- 396 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## ANTHROPOLOGY

Professors R.M. Krulfeld, R.L. Humphrey, Jr., A.S. Brooks (Chair), C.J. Allen  
 Professorial Lecturers D.H. Ubelaker, S. Hertz  
 Associate Professor J.C. Kuipers  
 Adjunct Associate Professors C.R. Rose, P.J. Cressey  
 Associate Professorial Lecturer N.L. Benco  
 Assistant Professor R.R. Grinker  
 Adjunct Assistant Professor E.M. Suthers

**Master of Arts in the field of anthropology**—Prerequisite: a bachelor's degree; a major in anthropology is preferred but not mandatory. The undergraduate program should have included courses above the introductory level in anthropological theory, social organization, linguistics, archaeology, and biological anthropology. Students with less background in anthropology may be admitted but may be required to take one or more undergraduate courses to make up deficiencies before beginning the degree program.

1. **General degree**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The minimum requirement consists of 24 credit hours of approved graduate course work, generally followed by a thesis (Anth 299–300). Under certain circumstances, however, the department may permit a program of study consisting of 36 credit hours of approved course work without a thesis. At least 6 credit hours drawn from the sequence Anth 201, 202, 203, 204 should be included in the program of study and should be completed during the first 24 credit hours of graduate course work. For students with fewer than four undergraduate semesters of one major foreign language, a reading knowledge examination in a major foreign language must be passed before beginning the third semester of graduate work. All students must pass a **general Master's Comprehensive Examination**.

2. **With a concentration in museum training**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study is the same as that described for the general degree, above, with the following



exceptions: the minimum requirement consists of 36 credit hours of approved graduate course work and must include from 12 to 15 credit hours of work in museum-related courses, 6 credit hours of which may be in an internship. Museum training students may substitute for the foreign language reading examination an appropriate course in chemistry or photography, if approved by the department. No thesis is required, but students are expected to submit to the department at least one research paper of publishable quality on a museum-related topic. Students whose primary interest is in museum techniques, rather than anthropology, are advised to apply to the master's program in museum studies (see Museum Studies). A program in museum education is also available.

3. *With a concentration in folklife*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study is the same as that described for the general degree, except that 6 hours of folklore core courses (Anth/AmCv 254 and 257) are also required.

4. *With a concentration in development*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study is the same as that described for the general degree, with the following exceptions: this is a 36-credit-hour nonthesis program, including 6–9 hours in development anthropology (Anth 220, 221, 222, 223), 18–21 hours in other anthropology courses, and 6–9 hours in economics and economic development. In some circumstances a thesis may be allowed. The program is designed to improve the student's understanding of complex development problems, such as economic change, population, health, education, migration, and ecology, within an anthropological framework. A limited number of internships may be available at public and private development agencies in the Washington area.

*Master of Science and Doctor of Philosophy in the field of geobiology*—see Geobiology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- |     |   |                         |
|-----|---|-------------------------|
| 201 | <b>Biological Anthropology</b> (3)  | Brooks                  |
|     | Theories, methods, and current issues in the various subdisciplines of biological anthropology. (Spring)  |                         |
| 202 | <b>Sociocultural Anthropology</b> (3)   | Krulfeld, Allen         |
|     | Major topics in contemporary social and cultural anthropology, stressing current journal and monograph materials. (Spring)  |                         |
| 203 | <b>Linguistic Anthropology</b> (3)  | Kuipers                 |
|     | Contemporary anthropological studies of language in biological, social, and historical perspectives. (Fall)   |                         |
| 204 | <b>Method and Theory in Archaeology</b> (3)   | Humphrey, Brooks, Benco |
|     | Survey of the most recent archaeological techniques and theoretical approaches to reconstructing and interpreting the cultures of the past. (Fall)  |                         |
| 211 | <b>Problems in Conservation</b> (3)   | Rose                    |
|     | Joint offering of the Anthropology and Art Departments. Individual conservation projects to determine composition, construction, decomposition of materials, and possible stabilization techniques. Conservation laboratory experience. Prerequisite or concurrent registration: Art or Anth 212. (Fall)  |                         |
| 212 | <b>Advanced Conservation Techniques</b> (3)   | Rose                    |
|     | Joint offering of the Anthropology and Art Departments. Physical structure, molecular biology, and chemistry of ethnographic materials. Chemistry and physics underlying techniques used to conserve these materials. Prerequisite: Art or Anth 293, Chem 50, and permission of instructor. (Fall)  |                         |
| 220 | <b>The Anthropology of Development</b> (3)  | Staff                   |
|     | The role of anthropology in development; theoretical perspectives that distinguish the contribution of anthropology to understanding processes of change in the Third World. Land reform, ecological impact, agricultural and pastoral systems, women's roles, migration, politics, and proletarianization. The role of anthropology in planning and implementing projects and policy. (Fall) |                         |
| 221 | <b>Key Variables in the Development Process</b> (3)   | Staff                   |
|     | Major factors required for anthropologists' development work in the areas of population, education, agriculture, irrigation, forestry, nutrition, health care, migration and resettlement, marketing, and communications. Isolation and study of the major variables and processes in each area to aid in successful planning, feasibility study, implementation, and evaluation. (Spring)    |                         |

- 222 Issues in Development (3)** Staff  
Topic to be announced in the *Schedule of Classes*.
- 223 New Research Methods and Techniques in Development Anthropology (3)** Staff  
Research methods in international development anthropology. Anthropologists' roles in multidisciplinary teams, including research-related activities, such as feasibility studies, social soundness analysis, and evaluations. Innovative research techniques, such as interactive data gathering, team survey methods, and rapid rural appraisal. Admission by permission of instructor. (Spring)
- 224 Internship in Development Anthropology (3)** Staff  
Supervised participation in a selected development agency. Opportunity to observe agency procedures and gain practical experience of agency activities. Admission by permission of instructor or department chair. May be repeated for credit. (Fall and spring)
- 247 Palaeoanthropology (3)** Brooks  
Survey of current research in hominid and hominoid evolution, focusing on the integrated nature of the field. Contributions from the geological and biological sciences will be stressed, together with innovative geochemical techniques for establishing chronological sequences. Prerequisite: Anth 147 or BiSc 150 or equivalent. (Spring, even years)
- 254 Folklore Theory (3)** Vlach  
Same as AmCv 254
- 257 American Folklife (3)** Vlach  
Same as AmCv 257.
- 258 Anthropology of Art, Aesthetics, and Symbolism (3)** Allen, Krulfeld  
Anthropological approaches to aesthetic problems and theories of symbolism in the context of ethnographic materials
- 260 Special Topics in Contemporary Anthropology (3)** Staff  
Exploration of a timely theoretical issue, enabling students to keep abreast of significant developments in the field. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit.
- 262 Applied Anthropology (3)** Staff  
Use of anthropological methods and techniques in such specific fields as government, community development, land reform, law, and medicine. (Fall)
- 263 Culture Contact and Change (3)** Grinker  
Change in Western and non-Western cultures: emphasis on general processes of change and interaction between simpler and more complex societies. (Fall)
- 264 Anthropological Museum Techniques (3)** Humphrey  
Principles of anthropological collection, classification, preservation, identification, interpretation, and exhibition of specimens, research and instructional use of the museum. Field trips to area museums. (Fall)
- 266 Technology (3)** Humphrey, Benco  
Cross-cultural examination of the form, function, meaning, and use of material culture and the behavior patterns involved in its production. (Spring, odd years)
- 267 Economic Anthropology (3)** Krulfeld, Grinker  
Comparative study of systems of production, distribution, consumption, political economy and economic change in both preliterate and complex societies.
- 268 Peasant Society (3)** Krulfeld  
Cross-cultural analysis of peasant societies, including their manner of functioning within larger social, economic, and cultural contexts. (Fall)
- 269 Key Issues in Social Organization (3)** Grinker  
Current issues in the analysis and interpretation of kinship and political and legal phenomena, with particular emphasis on problems of social and ideological change in developing countries and their effect on sex roles, the family, and social networks. (Spring)
- 272 Anthropology of Latin America (3)** Allen  
Specific topics, to be announced, will be selected from the following: mythology and ritual, artistic traditions, ethnic groups, Andean or Tropical Forest social organization, peasant movements and land reform, native cultures during the Colonial period, archaeological problems.



- 273 **Urban Anthropology** (3) Hertz  
A review of the literature on urban kin groups, occupational/class and ethnic communities, migrant adaptations; the nature of urbanism; urban poverty; urban field methods. (Spring)
- 282 **Advanced Archaeology—New World Prehistory** (3) Humphrey  
Current archaeological problems relating to the origin and development of aboriginal cultures. Specific topic to be announced in the *Schedule of Classes*. May be repeated for credit.
- 283 **Old World Anthropology—Physical Anthropology and Archaeology** (3) Brooks  
Current problems in relation to materials from the old world. Specific area to be announced in the *Schedule of Classes*. (Spring)
- 290 **Advanced Museum Research** (3) Staff  
Supervised individual research and/or field work at the Smithsonian Institution or other area museums, arranged in consultation with the museum and the Anthropology Department. Admission by permission of the department chairman. May be repeated for credit. (Fall and spring)
- 291 **Anthropology in the Museum** (3) Humphrey, Evans  
Anthropological materials (in the broadest sense), exhibits, and museums. Topics include museum anthropology, collections, research, interpretation, and education, with a focus on the practical problems of developing an anthropological exhibit hall. (Spring)
- 292 **Introduction to Conservation** (3) Rose  
Same as Art 292.
- 293 **Preventive Conservation Techniques** (3) Rose  
Same as Art 293.
- 294 **Archaeology Field/Laboratory Research** (3) Cressey, Brooks  
Same as AmCv 294. Field and/or laboratory techniques and interpretation. Topics may include excavation methods, recording, photography, conservation, stratigraphy, environmental reconstruction, typology, use-wear analysis, spatial analysis, faunal analysis, provenance studies, and dating. Specific research area and topics to be announced. May be repeated for credit. (Summer)
- 295 **Research** (arr.) Staff  
May be repeated for credit.
- 299–300 **Thesis Research** (3–3) Staff

#### APPLIED SCIENCE

Interdepartmental course offerings in the School of Engineering and Applied Science.

- 211 **Analytical Methods in Engineering I** (3) Eftis and Staff  
Engineering applications of the theory of complex variables: contour integration, conformal mapping, inversion integral, and boundary-value problems. Prerequisite: approval of department. (Fall)
- 212 **Analytical Methods in Engineering II** (3) Eftis, Mavriplis  
Algebraic methods appropriate to the solution of engineering computational problems: linear vector spaces, matrices, systems of linear equations, eigenvalues and eigenvectors, quadratic forms. Prerequisite: approval of department. (Spring)
- 213 **Analytical Methods in Engineering III** (3) Eftis and Staff  
Analytical techniques for solution of boundary-initial-value problems in engineering: wave propagation, diffusion processes, and potential distributions. Prerequisite: approval of department. (Fall and spring)
- 214 **Analytical Methods in Engineering IV** (3) Eftis and Staff  
Introduction to variational methods in engineering: Ritz and Galerkin approximation methods of boundary-value problems, aspects of linear integral equations arising from engineering analysis. Prerequisite: approval of department. (Spring, even years)
- 215 **Analytical Methods in Engineering V** (3) Eftis and Staff  
Advanced methods of solution of boundary-initial-value problems in engineering: characteristics, wave propagation, and Green's functions. Prerequisite: ApSc 213. (Fall, odd years)

**216 Special Topics in Engineering Analysis (3)**

Eftis and Staff

Selected topics, such as perturbation techniques applied to approximate solution of nonlinear boundary and initial-value problems in engineering; application of singular integral equations in problems of mechanics. Prerequisite: approval of department. (As arranged)

**ART**

Professors D.H. Teller, L.F. Robinson (Chair), J.F. Wright, Jr., A.H. Smith, J.L. Lake, T. Ozdogan, M.P. Lader, C.C. Costigan, J.C. Anderson, W.T. Woodward, B. von Barghahn

Professorial Lecturers G. Evans, L. Miller

Associate Professors H.I. Gates, D.M. Hitchcock, S.B. Molina, J.L. Stephanic, K.J. Harts-wick, D. Bjelajac

Adjunct Associate Professor C.R. Rose

Associate Professorial Lecturers D. Srinivasan, J.G. Kauffman, A.B. Barnhart, B.G. Carson, L.D. Miller

Assistant Professor F. Griffith

*Master of Arts in the field of art history*—Prerequisite: a Bachelor of Arts degree with a major in art history from this University, or an equivalent degree.

1. With a concentration in classical art and archaeology, medieval art, Renaissance and Baroque art, eighteenth- and nineteenth-century art, contemporary art, or American art—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences; 30 credit hours of course work including 6 hours of thesis research. As many as possible of the 30 credit hours of course work should be in third-group courses; not more than 6 hours may be taken in museum-related courses. Students are required to take a seminar in each of the following areas: classical, medieval, Renaissance, Baroque, modern, and American. A reading knowledge examination in German or French must be passed before completion of the first 9 credit hours of course work. A Master's Comprehensive Examination must be passed before students can enroll for the 6 credit hours of thesis research. A written thesis must be submitted to and approved by the faculty.

2. With a concentration in museum training—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences; 36 credit hours of course work, including 12 hours of internship credit (Art 201-2 and 271-72). As many as possible of the 36 hours of course work should be in third-group courses. Students are required to take a seminar in each of the following areas: classical, medieval, Renaissance, Baroque, modern, and American. Six hours of electives in art history or in museum-related courses are selected in consultation with the graduate advisor. A reading knowledge examination in German or French must be passed before completion of the first 9 credit hours of course work. Students are required to pass the Master's Comprehensive Examination in art history and may also be required to pass a comprehensive examination in museology as part of the requirements for the internship.

Acceptance into this program as a degree candidate is provisional, pending satisfactory completion of 12 credit hours of graduate art history courses and the approval of the Graduate Programs Committee (Department of Art).

The Art Department has established a program of study in affiliation with a number of museums and galleries including the Corcoran Gallery of Art, the Hirshhorn Museum and Sculpture Garden, the Museum of African Art, the National Museum of American Art, the Phillips Collection, the Renwick Gallery, and the Textile Museum.

Programs specific to museum studies and museum education are also available.

*Master of Fine Arts in the field of ceramics, design, printmaking, painting, photography, sculpture, or visual communication*—Prerequisite: a Bachelor of Fine Arts or a Bachelor of Arts degree with a major in fine arts in the field of ceramics, design, drawing, painting, photography, printmaking, sculpture, or visual communication. A 3.0 undergraduate grade-point average (on a 4.0 scale) and departmental approval of the applicant's work is required. This should consist of slide examples of work in the area of application as well as slides of representative works in other areas. Applicants to the photography program should submit photographic works only. Students planning to do graduate work in print-making or painting must have completed 12 credit hours of drawing at the undergraduate level before admittance to the master's program.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. A minimum of 45 credit hours of course work in fine arts is required; the number of required hours is determined in consultation with an advisor. As



much as possible of the course work should be in third-group courses, only 18 hours of which may be in one area; 6-9 hours are to be selected from related areas in consultation with the advisor. A creative thesis consisting of the execution of original works of art in ceramics, design, drawing, painting, photography, printmaking, sculpture, or visual communication will be completed under the supervision of a thesis advisor. In addition, the thesis must include a written statement and analysis of artistic purpose, subject to the approval of the thesis advisor and a second faculty reader. A representative portion of the work illustrating the creative thesis may be retained by the University at the discretion of the thesis director in agreement with the second reader.

**Doctor of Philosophy in the field of art history**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, and a Master of Arts degree in art history. Candidates must also pass written examinations in French and German and General Examinations in one major area of specialization and two other areas of specialization. Language examinations should be completed within the first academic year of course work. Programs are planned in consultation with a departmental committee.

**Research fields:** Nineteenth- and twentieth-century European art, American art, and Spanish art.

**Supporting fields:** Classical art and archaeology, early Christian and Byzantine art, Northern Renaissance art, Baroque art, and other fields as appropriate.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

## ART HISTORY

### 201-2 Museum Projects (3-3)

Staff

Open only to candidates for the degree of Master of Arts in the field of art history with a concentration in museum training.

### 203 Primitive Art (3)

von Barghahn

(Spring)

### 212 Advanced Conservation Techniques (3)

Von Endt

Same as Anth 212.

### 220 Seminar: Baroque Art of the 17th Century (3)

Hitchcock, von Barghahn

A reading knowledge of Italian is desirable for the Italian area and German for the northern area. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 221 Seminar: Renaissance Art (3)

Staff

A reading knowledge of French, German, or Italian is desirable, depending on the specific area. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 243 Seminar: American Art (3)

Bjelajac

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 244 Seminar: 19th-Century European Art (3)

Robinson

Reading knowledge of French desirable. Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 245 Seminar: 20th-Century European Art (3)

Lader

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 246 Seminar: Classical Art (3)

Hartswick

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 247 Proseminar: Medieval Art and Archaeology (3)

Anderson

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

### 248 Independent Research in Art History (3)

### 261 Seminar: Problems in Art History (3)

Staff

Topic announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.

- 271-72 Museum Techniques (3-3)** Staff  
Open only to candidates for the degree of Master of Arts in the field of art history. Practical work to be determined by Museum Training Committees at the institutions involved. (Academic year)
- 284 Seminar: Studies in American Art and History (3)** Staff  
Joint offering of the Art Department and the American Studies Program in affiliation with the National Portrait Gallery of the Smithsonian Institution. Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)
- 289-90 Thesis Research (3-3)** Staff
- 292 Introduction to Conservation (3)** Rose  
Same as Anth 292. Method and theory of conservation, including fine arts, ethnographic, archaeological, and monuments conservation; handling, restoration, preservation, storage, and display of museum specimens; materials and environmental reactions of ethnographic objects. (Fall, spring, and summer)
- 293 Preventive Conservation Techniques (3)** Rose  
Same as Anth 293. Preventive conservation: monitoring environmental conditions, examining objects and documenting their state, and identifying sources of deterioration. Students conduct tests, evaluate exhibition and storage areas, and help to improve museum conditions. Prerequisite: Anth/Art 292.
- 385-86 Readings in Art History (3-3)**  
Enrollment limited to doctoral candidates.
- 398 Advanced Reading and Research (arr.)**  
For students preparing for the doctoral examination.
- 399 Dissertation Research (arr.)**

## FINE ARTS

**Note:** All fine arts courses may be repeated for credit with approval of the department. Schedule of fees for Art 248 and 299-300: Ceramics—\$75; 2-D Design—\$24; 3-D Design—\$27; Drawing—\$75; Printmaking—\$36; Sculpture—\$27; Typography—\$75; Oil and Acrylic Painting—none; Watercolor—\$45; Photography—\$100; Visual Communication—\$75; Lithography—\$48; Serigraphy—\$54; Jewelry Design—\$36.

- 205 Advanced Photography: Zone System Tests (4)** Lake  
Tone control through exposure development tests. Completion of laboratory manual required. Prerequisite: Art 181 and 182 or permission of instructor. Laboratory fee, \$100. (Fall and spring)
- 206 Advanced Photography: Color Printing and Zone Proofs (4)** Lake  
Printing from color negatives. Correct color balancing and creative color shifts will be explored. Development of portfolio of prints utilizing approved theme and the exposure and development times established in Art 205. Prerequisite: Art 181 or 205, as determined by instructor. Laboratory fee, \$100. (Fall and spring)
- 208 Advanced Photography: Special Projects (4)** Lake  
Independent projects requiring approval prior to registration. Prerequisite: Art 181 and 182, or permission of instructor. Laboratory fee, \$100. (Fall and spring)
- 209 Exhibition and Display Design (3)** Miller
- 224 Advanced Ceramic Sculpture (3)** Ozdogan  
Continuation of Art 152 with emphasis on individual approach. Exploration of mixed media and mold casting. Laboratory fee, \$75. (Fall)
- 225 Advanced Ceramic Decoration (3)** Ozdogan  
Perfection of decorating techniques. Students establish style through independent exploration. Laboratory fee, \$75. (Spring)
- 226 Architectural Ceramics (3)** Ozdogan  
Advanced studies in ceramic murals and sculptures designed for indoor and outdoor architectural concepts. Laboratory tests and activities. Laboratory fee, \$75. (Spring)
- 231-32 Design III (3-3)** Gates  
New media and techniques in three-dimensional design. Laboratory fee, \$27 per semester. (Academic year)



- 235 **Design V: Textile Printing (3)** Teller  
Designing and executing textiles using the techniques of silk screen, block print, and batik. Laboratory fee, \$24. (Fall and spring)
- 248 **Independent Research in Fine Arts (3)** Staff  
For master's degree candidates; open to limited number of qualified undergraduates, with permission. Independent research arranged in consultation with individual instructor and graduate advisor. May be repeated for credit. Laboratory fee depending on area chosen. (Fall and spring)
- 249 **Theory of Design (3)** Costigan  
Stimulation and articulation of personal creativity and critical and presentational skills. Emphasis on visual diaries, problems of individual artistic production, and peer interaction on issues in contemporary art and design. Recommended for graduate students in all areas before the thesis and for senior majors with permission of instructor. Laboratory fee, \$9.
- 251 **Advanced Ceramic Design in Wheel Throwing (3)** Ozdogan  
Individual projects on the potter's wheel. Student establishes personal style and direction and perfects skills. Either pottery or sculptural approaches encouraged. Research in clays, glazes, and firings is required. Laboratory fee, \$75. (Fall and spring)
- 252 **Advanced Ceramic Design in Hand Building (3)** Ozdogan  
Individual projects in hand building. Student establishes style and direction and perfects skills. Either pottery or sculptural approaches encouraged. Research in clays and glazes is required. Laboratory fee, \$75. (Fall and spring)
- 253 **Industrial Ceramic Design/Mold Making (3)** Ozdogan  
Study in the multiple production process from model making to finished duplicate form as it exists on factory level. Methods include all aspects of model designing and making in clay and plaster; mold making in plaster; production methods from molds including press molding, slip casting, jiggering, and jolly-ing. Laboratory fee, \$75. (Fall and spring)
- 254 **Advanced Ceramic Technology (3)** Staff  
A thorough investigation of specific ceramic materials, clay bodies, and glazes, with an emphasis on formulation, alteration, and firing. Prerequisite: Art 151 or approval of instructor. Laboratory fee, \$75.
- 255-56 **Printmaking: Advanced Serigraphy (3-3)** Teller  
Utilization of principles and techniques of serigraphy toward development of personal statement and style. Prerequisite: Art 143-44. Laboratory fee, \$54 per semester. (Academic year)
- 257-58 **Printmaking: Etching and Engraving (3-3)** Griffith  
Advanced problems in etching and engraving, including composite processes, light-sensitive grounds, mixed media, and theoretical and practical problems of color prints. Laboratory fee, \$36. (Fall and spring)
- 259 **Printmaking: Advanced Lithography (3)** Barnhart  
Individual problems in lithography related to printing images from stones and metal litho plates. Prints in crayon, tonal washes, and multicolor. Emphasis on mastering the lithographic process and developing a personal statement and style. Laboratory fee, \$48.
- 260 **Printmaking: Relief Printing (3)** Griffith  
Advanced problems, practical and theoretical, in woodcut, wood engraving, collograph, composite techniques, and mixed media in monochrome and color. Laboratory fee, \$36. (Fall and spring)
- 265-66 **Painting IV (3-3)** Woodward  
Alternatives in pictorial dynamics. Assigned studio and independent problems in alla prima and mixed techniques. Material and model fee, \$39 per semester. (Academic year)
- 267-68 **Individual Problems in Photography (4-4)** Staff  
Limited to M.F.A. candidates and qualified undergraduates. Prerequisite: Permission of instructor and approval of project prior to registration. May be repeated for credit. Laboratory fee, \$100 per semester. (Academic year)
- 275 **Painting V (3)** Woodward  
Development of personal imagery. Individual problems and critiques. Material and model fee, \$39.

- 277 **Advanced Visual Communication: Packaging Design and Illustration (3)** Molina  
Advanced studio projects. May be repeated for credit provided the content differs. Laboratory fee, \$75. (Fall and spring)
- 278 **Advanced Visual Communication: Problem Solving and Applied Design (3)** Molina  
Advanced studio projects. May be repeated for credit provided the content differs. Laboratory fee, \$75. (Fall and spring)
- 279-80 **Sculpture IV (3-3)** Gates  
Advanced study aimed at development of concept and style. Prerequisite: permission of instructor. Laboratory fee, \$27. (Academic year)
- 281 **Sculpture V (3)** Gates  
Emphasis on individual sculptural concepts and materials. Prerequisite: permission of instructor. Laboratory fee, \$27. (Fall and spring)
- 299-300 **Thesis Research (3-3)** Staff  
Laboratory fee depending on area chosen.

## ART THERAPY

Adjunct Associate Professor E. Kramer

Assistant Professor K.J. Williams (Director)

Adjunct Assistant Professors W. Maiorana, A.J. Di Maria, A. Corson, C.T. Cox, B. Shostak, B. Sobol

Clinical Instructors N.J. Miller, M.M. Balbe ter Matt, F. Creo, A.L. Keeble, A. Mills, P. Prugh, L. St. Germain, V. Tarpley, E. White

Lecturer B. Barthell

Master of Arts in the field of art therapy—Prerequisite: a bachelor's degree, evidence of significant training and or experience in art, including painting, drawing, and clay modeling; course work in the behavioral and or social sciences, including personality theory, abnormal psychology, and child psychology.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences and successful completion of 36 credit hours of graduate course work. At least 24 credit hours must be in art therapy and must include ArTh 201, 203, 205-6 or 207 and 208. 224. 226. 283-84, and 293-94.

Fields of emphasis: adult art therapy, family art therapy, child art therapy, and research.

Five-Year Bachelor of Arts/Master of Arts in the field of art therapy—See the Undergraduate Programs Bulletin.

- 201 **Introduction to Art Therapy (3)** Corson  
Lectures, presentation of illustrative case material, class discussion of assigned readings, fieldwork. Survey covering range of art therapy practice, personality assessment and treatment approaches, historical development, main theoretical trends. Open only to art therapy degree candidates. (Fall)
- 202 **Case Studies in Art Therapy (3)** Di Maria  
Discussion of case material provided by students in order to refine methods of working and to improve written and oral reports. Instructor and other practitioners may provide supplementary illustrative material. Assigned reading. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Spring)
- 203 **Technique of Art Therapy (3)** Williams  
Art therapy approaches with individuals and groups of different diagnostic categories in various settings presented through illustrative clinical examples. Students experiment with numerous techniques through the use of art materials. Open only to art therapy degree candidates. (Fall)
- 204 **Psychodynamic Processes in Art Therapy (3)** Kramer  
Concepts of instinctual drives; ego development; mechanisms of defense; sublimation; transference and countertransference; maturation and regression applied to work with children, adults, families, and groups. (Spring)
- 205-6 **Family Art Techniques (3-3)** Cox, Sobol  
Principles of work with families, with emphasis on the use of art techniques for evaluation of family dynamics. The major focus is on opportunities to conduct



- and observe family art evaluations. Enrollment is limited to 12. Prerequisite: ArTh 201, 203. Open to art therapy degree candidates only. (Fall and spring)
- 207 **Art as Therapy with Children (3)** Maiorana  
Introduction to the practical and theoretical considerations involved in art as therapy with children. Focus on psychodynamics, artistic developmental stages, methods of child art evaluation, and basic issues in therapeutic guidance of the child. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Fall)
- 208 **Art Therapy with Adolescents (3)** Shostak  
Theoretical and practical issues in art therapy with adolescents in educational and clinical settings. Experiential work in art techniques appropriate to this population. Class discussion of readings on adolescent development. Prerequisite: ArTh 201, 203; open to others with permission of instructor. (Spring)
- 211 **Survey of Art Therapy (3)** Barthell  
Use of visual arts to enhance personal development; history, theories, range of practice in art therapy. Illustrated lectures, reading, discussion, studio work. Not intended for art therapy degree candidates. Open to advanced undergraduates with permission of instructor. (Fall)
- 224 **Process of Art Therapy (3)** Maiorana, Williams  
Exploration of the treatment process through discussion of literature from art therapy and related fields. Several critical papers will be required. Must be taken concurrently with ArTh 226. (Spring)
- 226 **Process of Art Therapy (3)** Maiorana, Williams  
Exploration of the treatment process through rehearsal of fundamental ways of being a therapist and presentation of case material from field experience. Video- and audiotaping required. Must be taken concurrently with ArTh 224. (Spring)
- 275 **Group Art Therapy (3)** Williams  
Experience as participant, observer, and leader in an art-centered group; required reading; theory of group process. Open to art therapy master's degree candidates and others with permission of instructor. (Summer)
- 283-84 **Practicum in Art Therapy (1-2)** Staff  
The sequence of ArTh 283-84 and 293-94 requires a minimum of 1100 hours of fieldwork connected with service to clients. On-site individual supervision is supplemented with group supervision by departmental staff. Prerequisite: ArTh 201 and 203. Open only to art therapy degree candidates.
- 285 **Special Projects in Art Therapy (arr.)** Staff  
Individual work based on research. Empirical, clinical, and library research may be undertaken, as well as the development of new procedures. Details to be worked out with each student. May be repeated for credit with advisor's approval. Open only to degree candidates. (Fall and spring)
- 289 **Special Topics (1 to 3)** Staff  
Connections between art therapy and other disciplines; new developments in the field. May be repeated for credit with approval of advisor. Open to art therapy degree candidates and others with permission of instructor.
- 290 **Workshops in Art Therapy (3)** Staff  
Art therapists and other mental health professionals will conduct four weekend workshops during the semester. Emphasis on the elucidation of concepts of treatment through lectures, discussion, and participation. (Fall)
- 293-94 **Practicum in Art Therapy (2-1)** Staff  
Continuation of ArTh 283-84.
- 298 **Reading and Research (1 to 3)** Staff

### ASSOCIATION MANAGEMENT

See the School of Business and Public Management for the program of study leading to the degree of Master of Association Management.

- 270 **The Association: Roles, Influence (3)** Ernstthal  
Introduction to the Association Management Program; development and nature of interest representation; its history; varieties of associations and their roles and functions; legal constraints, responsibilities, and ethics. (Fall and spring)

- 271 Marketing Management for Associations (3)** Staff  
Market analysis, product planning, channels of distribution, pricing, and promotional decision making are presented, with particular application to associations. Topics include membership recruitment; fees, dues, and other monetary issues; physical location of the association; staff-membership contacts; promotion of association goals. (Fall)
- 272 Communications and Media Relationships for Associations (3)** Kasle  
Primarily for students in association management. The nature of the communication process, including both interpersonal and organizational communication. Problems and approaches; barriers to good communication. Methods of improving organizational communication. The media and their role; approaches to media relationships. (Spring)
- 273 Association Law and Lobbying (3)** Ernstthal  
The role of the association in the political process, including the context within which interests are represented before Congress and the executive branch. Interest groups and their ideas and techniques. Rules and regulations governing lobbying activities and personnel matters. (Fall)
- 274 Marketing Strategy for Associations (3)** Divita  
Analysis of complex marketing problems of associations that involve policy and operational decisions. Creative marketing strategy. Prerequisite: AM 271. (Summer)
- 275 Information Systems for Associations (3)** Staff  
Introduction to the concepts of information systems as employed in associations. Database management systems, telecommunications systems, small business computers. (Fall)
- 276 Organization and Management of Associations (3)** Ernstthal  
Integrative approach to organizational and management concepts, theories, and practices, with particular attention to the problems of associations and similar types of organizations. Functions, roles, and responsibilities of the association manager. (Spring)
- 277 Financial Management for Associations (3)** Staff  
An overview of basic accounting principles and practices as they apply to associations, with attention to the economics of association management and financial planning, reporting, and auditing. Investments, revenues, bonds, debt, government funds. (Fall)
- 279 Current Issues in Association Management (3)** Ernstthal  
A review of elements of association management, with attention to the number and variety of associations and their responsibilities. Particular attention is given to the problems associations face now and will face in the future. A capstone seminar providing a review and synthesis of the Association Management Program. A significant research project is required. (Fall and spring)

## BIOCHEMISTRY AND MOLECULAR BIOLOGY

Professors J.M. Bailey, A.L. Goldstein (Chair), L.L. Gallo, A. Kumar, G. Walker, T. Moody, G. Fiskum

Associate Professors J.Y. Vanderhoek, V. Hu

**Master of Science in the field of biochemistry**—Prerequisite: a bachelor's degree. The undergraduate program must have included the following courses, or equivalent: BiSc 11–12; Chem 11–12, 22, 151–52, 153–54; Phys 1, 2.

**Required:** the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Bioc 221–22, 223, 227, 234, 250, 266, 299–300, and the Comprehensive Examination. It is expected that students will complete all of the required work in approximately two years.

**Doctor of Philosophy in the field of biochemistry**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Bioc 221–22, 223, 227, 234, 250, 266, 399, and the General Examination.

**Research fields:** endocrinology—thymosins, steroid hormones, prostaglandins; viral gene regulation, antiviral chemotherapy, immunology—immunochemistry, viral gene transactivation; lipids and membranes—essential fatty acids, membrane biochemistry, lipoproteins, complex lipids, cholesterol, peroxides, atherosclerosis; complement, toxins,



HIV—1, neurochemistry—growth factors, bombesin, peptide receptors; bioenergetics—mitochondria,  $\text{Ca}^{2+}$  transport, tumor cell metabolism, ischemia.

- 221–22 General Biochemistry (4–4)** Fiskum, Hu, and Staff  
A comprehensive course in general biochemistry for graduate students in biomedical sciences and undergraduate students in biology and chemistry. Prerequisite: Chem 152, 154. (Academic year)
- 223 Physical Biochemistry (3)** Vanderhoek  
Lectures cover basic laboratory techniques used in contemporary biochemical and molecular biological research. (Fall)
- 227 Biochemistry Seminar (1)** Fiskum and Vanderhoek  
Current literature in biochemistry. Limited to graduate students in the department. May be repeated for credit. (Fall and spring)
- 230 Current Topics in Enzymology (2)** Bailey and Staff  
Directed readings in various areas of enzymology. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 234.
- 234 Structure and Function of Proteins and Enzymes (3)** Hu and Staff  
Structure-function relationships of proteins, enzyme kinetics, regulation and reaction mechanisms, and other special topics. Prerequisite: Bioc 221. (Spring)
- 235 Current Topics in Bioenergetics (1 or 2)** Fiskum  
Directed readings in various areas of bioenergetics. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 222.
- 240 Nutrition (2)** Walker and Staff  
Content includes discussion of RDA, nitrogen balance, vitamins and minerals, diets, and other special topics. Prerequisite: Bioc 201 or 221–22. (Spring)
- 250 Molecular Biology (3)** Kumar and Staff  
Content includes the organization and replication of genetic material, transcriptional and translational machinery, regulation of eukaryotic gene expression, and other special topics. Prerequisite: Bioc 201 or 221–22. (Fall)
- 251 Current Topics in Molecular Biology (1 or 2)** Kumar and Staff  
Directed readings in the area of molecular biology. May be repeated for credit. Enrollment limited to graduate students in the department; others may enroll with approval of instructor. Prerequisite: Bioc 250. (Spring)
- 252 Biochemical and Molecular Aspects of Selected Diseases (2)** Kumar and Staff  
Emphasis on the biochemical and molecular aspects of selected diseases. The format will be of a tutorial type, including presentations of material by students. (Spring, alternate years)
- 260 Biochemistry of Lipids and Membranes (2)** Vanderhoek  
Biochemistry, structure, and function of various lipid classes, membranes, and receptors. Prerequisite: Bioc 221–22. (Spring, alternate years)
- 261 Current Topics in Lipids (1 or 2)** Gallo, Vanderhoek, and Staff  
Directed readings in the area of lipid biochemistry. May be repeated for credit. Enrollment limited to graduate students in the department.
- 262 Lipoproteins (2)** Gallo  
Composition, synthesis, and metabolism of lipoproteins in normal and dyslipoproteinemic subjects. Prerequisite: Bioc 221–22. (Spring, alternate years)
- 266 Cellular Biology (3)** Fiskum, Vanderhoek, and Staff  
Structure and function of cellular membranes, cytoskeleton, subcellular organelles, cellular bioenergetics, and intercellular interactions. Prerequisite: Bioc 221–22. (Spring)
- 270 Biochemistry and Cell Biology of the Immune Response (2)** Goldstein and Staff  
Biochemical aspects of the immune response at the molecular and cellular level. Modern experimental approaches to immunology and cell biology. Prerequisite: Bioc 221–22 and Micr 229, or permission of instructor. (Spring)
- 271 Current Topics in Immunology (1 or 2)** Goldstein and Staff  
Directed readings in the area of biochemical immunology. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 270.

- 280 Neurochemistry (2)** Moody and Staff  
Content includes molecular structure and function of nerve tissue; intra- and interneuronal communication mechanisms; biochemistry of various brain dysfunctions; and other special topics. Prerequisite: Bioc 201 or 221-22. (Fall)
- 281 Current Topics in Neurochemistry (1 or 2)** Moody and Staff  
Directed readings in neurochemistry. May be repeated for credit. Enrollment limited to graduate students in the department. Prerequisite: Bioc 280.
- 295 Research (arr.)** Staff  
Participation in a project under investigation in the department or one in a related field suggested by the student and approved by the staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring)
- 299-300 Thesis Research (3-3)** Staff
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## BIOLOGICAL SCIENCES

Professors S.O. Schiff, D.L. Atkins, R.K. Packer (Chair), R. Donaldson, T.L. Hufford

Professorial Lecturer D. Goldman

Associate Professors R.E. Knowlton, H. Merchant, D.E. Johnson, J.R. Burns, K.M. Brown,

D.L. Lipscomb

Assistant Professors E.F. Wells, D.W. Morris, A. Alani (Research)

**Master of Science in the field of biology, botany, or zoology**—Prerequisite: a bachelor's degree with a major in one of the following from this University, or an equivalent degree: (1) *Biology field*—an undergraduate major in biology, botany, or zoology; (2) *Botany field*—an undergraduate major in botany or biology; (3) *Zoology field*—an undergraduate major in zoology or biology. The undergraduate program must have included the following courses, or equivalent: Chem 151-52 and 153-54; Math 31; Phys 1, 2, 5, 6; Stat 91 or 127.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The minimum requirement consists of 24 credit hours of approved course work plus a thesis (equivalent to 6 credits). With the permission of the department, a student may elect a program of study consisting of 36 credit hours of approved course work without a thesis.

**Master of Arts in the field of museum studies, with specialization in the biological sciences, see Museum Studies.**

**Doctor of Philosophy in the field of biology, botany, or zoology**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, plus satisfactory completion of a Preliminary Examination and the General Examination in at least three areas of biology. The program of study and fields of study are determined in consultation with an advisory committee appointed for each candidate.

**Major Research Areas:** ecology, evolution and systematics, plant biology, genetics, cell and molecular biology, developmental biology, vertebrate and invertebrate anatomy and physiology, marine and freshwater biology.

**Master of Science and Doctor of Philosophy in the field of geobiology, see Geobiology.**

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 204 Seminar: Invertebrate Zoology (3)** Knowlton  
Review of selected topics in physiology, development, and ecology of invertebrate animals, including reports on original publications. May be repeated for credit. Prerequisite: BiSc 130 or equivalent. (Fall)
- 208 Bioenergetics (3 or 4)** Merchant  
Study of energy fixation and transfer in ecosystems and of their role in behavior, evolution, population dynamics, and species interactions. Students enrolling for 4 credits will devote one additional class meeting per week to an investigation of



- the nature and methods of science. Prerequisite: BiSc 154 or permission of the instructor. (Fall, odd years)
- 209 **Seminar: Principles and Mechanisms of Organic Evolution** (3) Lipscomb  
Current problems and issues in evolution; speciation, macroevolution, biogeography, and topics of special interest to participants. Prerequisite: BiSc 150 or equivalent. (Spring)
- 210 **Methods of Study of Evolution** (4) Lipscomb  
Lecture (3 hours), laboratory and field (2 hours). Review of selected topics of current interest in the study of evolution, such as principles of phenetic and phylogenetic systematics, study of biogeography, and biochemical methods of examining evolution. Laboratory fee, \$40. Prerequisite: BiSc 150 or equivalent. (Fall, even years)
- 211 **Symbiosis and Evolution** (3) Lipscomb  
Study of the adaptations and evolution of parasites, including coevolution of parasites and hosts, competition for hosts, evolution of life cycles, and topics of special interest to participants. (Fall)
- 212 **Seminar in Comparative Reproductive Biology** (3) Burns  
Review of selected topics in animal reproduction, including neuroendocrine regulation, reproductive cycles and behavior, and gonadal pathology. Prerequisite: BiSc 124 or equivalent. (Spring)
- 220 **Seminar: Cell Biochemistry** (3) Donaldson  
Course content changes each session. Topics include organelle function, membrane transport, and cellular receptors. May be repeated for credit. Prerequisite: BiSc 102 or 103 or 112 or equivalent. (Spring)
- 221 **Variation and Evolution in Plants** (3) Wells  
Biosystematics of plants, covering the literature, concepts, and methodology of chemotaxonomy, breeding systems, cytogenetics, population genetics, and other studies of speciation, evolution, and classification. Prerequisite: BiSc 107 or 140 or 142 or 150. (Spring, even years)
- 227 **Seminar: Genetics** (3) Johnson  
Review of selected topics in genetics, with emphasis on current literature; topics of special interest to participants encouraged. May be repeated for credit. Prerequisite: BiSc 107 or equivalent. (Fall, odd years)
- 228 **Population Genetics** (3) Johnson  
Origin, maintenance, and possible significance of genetic variation in populations. Selection, genetic drift, microevolution of species, and speciation are emphasized. Both theoretical and applied aspects of population genetics are discussed. Prerequisite: BiSc 107 or equivalent. (Fall, even years)
- 229 **Cytogenetics** (3) Staff  
Behavior of chromosomes in mitosis and meiosis as a basis for the transmission of genes from one generation to the next through reproduction and the influence of cytogenetic processes on the mechanisms of evolution. Prerequisite: BiSc 102 or 103 and 107 or equivalent. (Fall)
- 230 **Human Genetics** (3) Staff  
Genetic mechanisms of transmission and expression of human traits, with emphasis on biochemical and cytogenetic aspects. Prerequisite: BiSc 107 or equivalent; previous course work in cell biology or cell biochemistry strongly recommended. (Spring)
- 238 **Seminar: Current Topics in Phycology** (3) Hufford  
A review of current literature regarding selected aspects of algal systematics, morphology, physiology, or ecology. (Fall, even years)
- 242 **Advanced Plant Ecology** (3) Wells  
Study of selected topics in adaptive plant strategies and physiological plant ecology. May be repeated for credit. Prerequisite: BiSc 112 or 154 or 155 or 158. (Spring, odd years)
- 243 **Seminar: Ecology** (3) Merchant  
In-depth study of selected topics, including reports on original publications. May be repeated for credit. Prerequisite: BiSc 154 or equivalent. (Spring, even years)
- 249 **Seminar: Developmental Biology** (3) Brown  
Discussion and reports on recent research on the endocrinological, genetic, and biochemical aspects of animal development. Prerequisite: one course in developmental biology or cell biology. May be repeated for credit. (Spring)

- 252 **Seminar: Neurobiology** (3) Atkins  
Study of current publications in comparative neurobiology. May be repeated for credit with instructor's permission. (Spring, even years)
- 272 **Scanning Electron Microscopy** (3) Atkins  
Theory and practice of scanning and transmission electron microscopy, including specimen preparation, photography, and analysis of ultrastructural observations. Laboratory fee, \$65. (Fall)
- 274 **Gene Regulation and Genetic Engineering** (3) Morris  
The control of gene expression as illustrated by several prokaryotic and eukaryotic model systems: discussions of recombinant DNA techniques. Prerequisite: BiSc 107. (Spring, odd years)
- 275 **Introduction to Recombinant DNA Techniques** (3) Morris  
Lecture, 1 hour; laboratory, 4 hours. Basic techniques of genetic manipulation: isolation of phage and plasmid DNA, cloning of genes, transformation of bacteria, mutagenesis of cloned genes, and other techniques. Prerequisite: BiSc 102 or 107 or 137 or equivalent and permission of instructor. Laboratory fee, \$40. (Fall, even years)
- 295 **Research** (arr.) Staff  
Investigation of special problems. May be repeated for credit. (Fall and spring)
- 299-300 **Thesis Research** (3-3) Staff
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## CHEMISTRY

Professors T.P. Perros (Emeritus), D.G. White, J.B. Levy (Emeritus), N. Filipescu, E.A. Cares, D.A. Rowley, D. Ramaker (Choir), M. King, A. Montaser  
Associate Professors J.H. Miller, A. Vertes  
Assistant Professors R.M. Georgiadis, M.R. Johnson

**Master of Science in the field of chemistry**—Prerequisite: a bachelor's degree with a major in chemistry from this University, or an equivalent degree.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Course work must include Chem 213 and 221 and at least two of the following: Chem 207, 235, and 251. Proficiency in computer programming must be demonstrated. Candidates are required to pass a Master's Comprehensive Examination.

**Thesis option**—30 credit hours of approved courses are required, including Chem 299-300, Thesis Research, which may be in analytical, inorganic, organic, or physical chemistry.

**Nonthesis option**—36 credit hours of approved courses are required, including Chem 298. Up to 9 credit hours in other departments relevant to the student's area of interest may be included in the program, subject to the approval of the Department of Chemistry. Students who are or will be employed in organizations dealing with science, technology, and public policy programs may wish to select from the following courses: PSc 203, 217, 222, 223, 252; PAd 260, 261; Mgt 233, 234.

**Master of Science in the field of geochemistry** (an interdepartmental degree offered by the Departments of Chemistry and Geology)—Prerequisite: a bachelor's degree with a major in chemistry or geology from this University, or an equivalent degree.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Chem 111-12, 213 or other upper-level chemistry course approved by the advisor, and 299-300, and Geol 141, 241 or 243, and 249. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. Stat 129 or an equivalent course approved by the Department of Chemistry or Geology must be passed.

**Five-Year Bachelor of Science/Master of Science in the field of chemical toxicology**—See the Undergraduate Programs Bulletin.



**Doctor of Philosophy in the field of chemistry**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Chem 207, 213, 221, 235, and 251 are normally required of the doctoral student, in addition to other courses and requirements as determined by consultation with the departmental program committee. Proficiency in computer programming must be demonstrated. The General Examination requirement is replaced by a two-part requirement consisting of a cumulative examination system and a proposal for a research problem.

**Research fields:** analytical and molecular spectroscopy, chemical instrumentation, combustion chemistry, chemical toxicology, fluorine chemistry, forensic chemistry, geochemistry, organic synthesis/natural products, photochemistry, structure/reactivity studies, surface science, theoretical chemistry, trace analysis, transition metal complexes.

Ph.D. students in chemistry may substitute up to 12 hours of Dissertation Research (Chem 399) in the form of course work jointly approved by the Chemistry Department and the Science, Technology, and Public Policy program. The purpose of this option is to provide a useful background for chemistry doctoral students who may be employed in government agencies dealing with science, technology, and public policy programs. The 12 hours may be selected from specified courses offered by the Departments of Management Science, Political Science, and Public Administration and by the Elliott School of International Affairs.

**Graduate Placement Examinations:** All entering students in the master's and doctoral programs in the field of chemistry are required to take the American Chemical Society Graduate Level Placement Examinations, given by the Department of Chemistry, prior to registration in Columbian College and Graduate School of Arts and Sciences. The four placement examinations (in the disciplines of analytical, organic, inorganic, and physical chemistry) are of the multiple-choice type. These tests are designed to cover the subject matter in the disciplines generally taught in modern undergraduate programs preparatory for graduate work in chemistry, and the results are used by the department to advise the individual student in planning a program of courses appropriate to the student's background.

All graduate students are required to participate in the seminar and colloquium programs.

Upon consultation with course instructors, specific prerequisites may be waived for the particular courses.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

#### 207 Chemical Bonding (3)

Quantum mechanics, approximate methods, electron spin, Pauli principle, atomic and molecular structure. Prerequisite: Chem 112. (Fall)

Ramaker

#### 211-12 Physical Chemistry (2-1)

Same as Chem 111-12. Admission only by departmental permission. Credit assigned upon satisfactory completion of Chem 213. (Academic year)

Georgiadis, Ramaker

#### 213 Chemical Thermodynamics (3)

Application of thermodynamics to chemical problems. Emphasis on statistical calculation of thermodynamic properties. Prerequisite: Chem 112 or 212. (Spring)

Miller

#### 218 Molecular Spectroscopy (3)

Applications of quantum mechanics and group theory to the interpretation of electronic, vibrational, rotational, and magnetic resonance spectroscopy. Prerequisite: Chem 207. (Spring, odd years)

Georgiadis

#### 220 Selected Topics in Analytical Chemistry (1 to 3)

Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of analytical chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.

Staff

#### 221 Advanced Analytical Chemistry I (3)

Theory and application of recent spectrometric methods of analysis, including advances in optimization techniques, optical instrumentation, atomic spectrometry, laser-based analytical techniques, X-ray methods, and surface analysis techniques. Prerequisite: Chem 122. (Fall)

Montaser

- 222 Advanced Analytical Chemistry II (3)** Staff  
Theory and application of electroanalysis and separations by physiochemical methods. Prerequisite: Chem 122. (Spring, even years)
- 230 Selected Topics in Inorganic Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of inorganic chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.
- 235-36 Advanced Inorganic Chemistry (3-3)** Staff  
Application of modern chemical theories to inorganic substances and reactions; detailed study, developed from the periodic table, of the chemistry of the more common elements; introduction to bioinorganic and organometallic chemistry. Prerequisite to Chem 235: Chem 112, 152. Prerequisite to Chem 236: Chem 235. (Academic year)
- 240 Selected Topics in Physical Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field of physical chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.
- 250 Selected Topics in Organic Chemistry (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field in organic chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.
- 251-52 Advanced Organic Chemistry (3-3)** Filipescu  
Synthesis, reactions, and properties of organic compounds; fundamental theories of organic chemistry, emphasis on reaction mechanisms. Prerequisite to Chem 251: Chem 112, 152. Prerequisite to Chem 252: Chem 251. (Academic year)
- 257 Physical-Organic Chemistry (3)** Staff  
The transition state theory of chemical kinetics, applications to reaction mechanisms; kinetic isotope effects, linear-free energy relationships, concentrated and "super" acids, Woodward-Hoffman rules, free radical reactions. Prerequisite: Chem 252 or permission of instructor. (Fall, odd years)
- 258 Synthesis and Structure Determination in Organic Chemistry (3)** Staff  
The design of syntheses for complex organic molecules; survey of modern synthetic methods, including asymmetric induction; spectroscopic methods of structure determination. Prerequisite: Chem 251 or permission of instructor. (Fall, even years)
- 259 Polymer Chemistry (3)** Staff  
A study of the preparation, properties, and structure of macromolecules. Prerequisite: Chem 152 and 110 or 111 or permission of instructor. (Fall, odd years)
- 260 Selected Topics (1 to 3)** Staff  
Advanced topics offered in a modular format to allow an in-depth examination of a self-selected field in chemistry. One to three topics may be chosen for a given semester. May be repeated for credit.
- 295 Research (arr.)** Staff  
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 credit hours. (Fall and spring)
- 298 Independent Study (3)** Staff  
Limited to master's degree candidates. A survey of a topic approved by departmental staff and resulting in a written report, and the presentation of a seminar.
- 299-300 Thesis Research (3-3)** Staff
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## CIVIL, MECHANICAL, AND ENVIRONMENTAL ENGINEERING

Professors H. Liebowitz, J.E. Feir, T.G. Toridis, J. Eftis, R. Goulard, K. Mahmood, A.M. Kiper (Chair), M.K. Myers, R.E. Kaufman, D.M. Esterling, C.M. Gilmore, J.L. Whitesides, V. Klein, D.L. Jones, B.M. Kramer, C.A. Garriss, J.D. Lee, R.H. Tolson (Research)



Adjunct Professors W.P. Reid, M.P. Caus, B.W. Hannah, B. Whang, D.D. Moran, M.O. Critchfield, A.G. Adamantiades, M. Yachnis, C.F. Scheffey, B. Dendrou, D.W. Coder  
 Professional Lecturers N.L. Basdekas, D.R. Levin, W.D. Erickson, G.D. Love, D.J. Michel, B. Miller, E.F. Skelton, C.J. Astill, P.D. Maycock, J.C. Hardin, D.U. Gubser, J.I. Bregman, E. McCafferty, R.C. Macon, P.S. Lam, W.J. Boettinger, G.C. Everstine, J.A. Sprague, R.W. Barnwell, D.L. Dwoyer, F. Farassat, C.G. Interrante, A. Kehnemui, T. Kusuda, C.R. Hauer, D.R. Mulville, D.R. Levin, J.-N. Juang, E.B. Pritchard, J.L. Thomas, M.F. Card, M.D. Griffin, W.R. Hancuff, Jr., J.M. McMichael, I.S. Raju, M. Birkan, A. Stern, F. Markley, S. Tignor

Associate Professors M.I. Haque, R. Löhner (Research), S. Sarkani, N.E. Bedewi

Adjunct Associate Professor M.A. Imam

Associate Professorial Lecturers D.W. Ellison, R.Y.-Y. Ting, M.C. Cullingford, F.L. Willingham, Jr., A.B. Wardlow, Jr., J.C. Coolbaugh, K. Khozeimeh, R.L. Bowles, W.D. Burrows, C. Winklehaus, R.F. Jones, Jr., S.C. Mehrotra, S.M. Joshi, S.L. Zimmerman, C.C. Frantz, A. Ghamarian, J.F. O'Dea, W.B. Fichter, L.B. Garrett, P.N. Majumdar, J.N. Moss, P. Dechaumphai, C.H. Gerhold, V. Mukhopadhyay, T.K. O'Brien

Assistant Professors A.D. Cutler, C. Mavriplis, Y.-L. Shen, Y.M. Najjar, B.R. Bierck

Assistant Professorial Lecturers R. Lee, T.L. Walton, Jr., G.E. Hicho, M.P. Gottlieb, E.T. Von Briesen, J.M. Luckring, K.G. Garrahan, A.L. Dinsbacher, R.P. Weston, S. Feng, L.C. Hartung, E.A. Morelli, M.J. Shuart, P.A. Gnoffo, P. Matic

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

## CIVIL ENGINEERING

### 201 Design of Metal Structures (3)

Toridis

Structural behavior of metal structures, conception and design of advanced structural components and systems, hysteretic behavior, plastic design principles, box-type girders, cable systems, composite girders, and special topics. Prerequisite: CE 191 or equivalent. (Spring)

### 202 Design of Reinforced Concrete Structures (3)

Toridis and Staff

Structural behavior of reinforced concrete structures, ultimate strength and deformation characteristics; design of structural components including beams, columns, floor slabs, box-type girders; introduction to prestressed concrete; special topics. Prerequisite: CE 192 or equivalent. (Fall)

### 203 Prestressed Concrete Structures (3)

Toridis and Staff

Structural behavior and failure modes of prestressed concrete structures; design in prestressed concrete, including long-span structures, bridges, and precast systems. Prerequisite: CE 192 or equivalent. (Spring, alternate years)

### 204 Shear Strength and Slope Stability of Soils (3)

Najjar and Staff

Theories of soil strength and failure, soil improvement, theories of lateral earth pressure with application, stability analysis by both classical and numerical methods. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of department. (Fall, even years)

### 205 Permeability and Compressibility of Soils (3)

Najjar and Staff

Nature of soil, permeability and seepage analysis involving foundations, dams, sheet piles and wells; stress distribution in earth masses; one- and three-dimensional theories of consolidation; analysis of settlement. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of department. (Fall, odd years)

### 206 Geotechnical Engineering (3)

Najjar and Staff

Problems associated with subsurface exploration. Principles of soil mechanics applied to the analysis and design of mat foundations, pile foundations, retaining structures including sheeting and bracing systems, and waterfront structures. Foundations on difficult soils and reinforced earth structures. Prerequisite: approval of department. (Spring)

### 207 Soil Dynamics (3)

Najjar and Staff

Stress-strain behavior of soil under transient and repeated loads, effects of earthquakes on foundations and earth dams, design of machinery foundations. Prerequisite: approval of department. (As arranged)

### 208 Rock Engineering (3)

Staff

Classification and properties of rock; nature of rock masses and rock discontinuities; field exploration; methods of excavation; design and applications to

- foundation slopes, tunnels, and chambers in rock. Prerequisite: approval of department. (As arranged)
- 209 **Probabilistic Methods in Geotechnical Engineering** (3) Staff  
Review of probability concepts, probabilistic theory for particulate media; variability of soil properties; applications of reliability analysis to geotechnical problems, such as shallow foundations and soil slopes; decision analysis in geotechnical engineering. (As arranged)
- 210 **Methods of Structural Analysis** (3) Toridis and Staff  
Modern methods of analysis of statically indeterminate structures, matrix analysis based on flexibility, stiffness, energy and variational methods, substructuring techniques; consideration of plastic collapse of structures; introduction to the finite element method. Prerequisite: graduate status. (Fall)
- 211 **Environmental Chemistry** (3) Bierck and Staff  
Principles of chemistry of natural waters, water supplies, wastewaters, hazardous wastes. Stoichiometry, equilibrium, solubility, kinetics, organic chemistry, biochemistry, analytical techniques. Examples from water wastewater practice to illustrate applications. Prerequisite or concurrent registration: CE 240. (Fall, odd years)
- 212 **Open Channel Flow** (3) Mahmood and Staff  
Types and regimes of flow; energy and momentum principles, uniform flow, gradually varied flow, spatially and rapidly varied flow. Flow in nonprismatic channels. Unsteady flow; dam break problem, flood routing. Prerequisite: CE 193 or ME 221. (Fall)
- 213 **Hydraulic Engineering** (3) Haque and Staff  
Hydraulic design of conveyance, regulating, and measurement structures. Design for spillways, energy dissipators, inlet and outlet works related to dams. Forces on hydraulic structure and stability analysis. Hydraulic turbines and pumps. Design considerations for flow through pipes. Transients and cavitation. Prerequisite: CE 193 or approval of department. (Spring)
- 214 **Design of Dams** (3) Mahmood and Staff  
Project planning and investigations. Types of dams; design of earth-rock fill dams; stability analysis, foundation treatment, wind-wave protection. Construction methods for dams. Reservoir sedimentation. Safety inspection of dams. Prerequisite: CE 193 or graduate status. (Spring, even years)
- 216 **Advanced Hydrology** (3) Mahmood  
Precipitation, evaporation, and transpiration. Soil physics; stream flow, drainage basins, hydrograph analysis, and stream-flow routing. Design criteria, flood frequency statistics and analysis, flood forecasting and control, water-supply forecasting. Prerequisite: CE 195 or equivalent. (Spring, even years)
- 219 **Groundwater and Seepage** (3) Haque and Staff  
Permeability theory of groundwater flow, flow nets, analogs, computer solutions; applications to engineering problems such as excavation dewatering, flow through dams, stabilization of earth slopes. Prerequisite: approval of department. (Spring)
- 220 **Urban Transportation Engineering** (3) Staff  
Introduction to urban transportation planning. Analysis of urban transportation requirements. Evaluation procedure for selecting among alternative solutions. Prerequisite: approval of department. (Fall, odd years)
- 221 **Pavement and Runway Design** (3) Staff  
Pavement types, wheel-load characteristics; stresses in pavements and subgrades; empirical methods of design of flexible and rigid highway and airfield pavements; general principles of runway design. Prerequisite: CE 202, 204 or 205. (Spring, odd years)
- 223 **Traffic Engineering** (3) Staff  
Roadway traffic capacity and other road network performance measures; methods of characterizing steady and unsteady traffic flow phenomena; traffic behavior monitoring techniques, instruments, and data processing; traffic control signalization theory and practical implementation. Prerequisite: approval of department. (Fall, even years)
- 237 **Advanced Sanitary Engineering Design** (3) Bierck and Staff  
Elements of design including basic parameters and hydraulic requirements. Layout and design of water supply and wastewater systems, pumping stations.



- and treatment plants. Plant expansions and modifications. Prerequisite or concurrent registration: CE 241. (Fall, even years)
- 240 **Principles of Environmental Engineering** (3) Bierck and Staff  
Basic concepts of water, air, and terrestrial environments and interrelationships among them. Principles of environmental chemistry and microbiology. Assessment of environmental quality and impacts. Environment and health. Water and wastewater systems. Legal and regulatory controls. (Fall)
- 251 **Water and Wastewater Treatment Processes** (3) Bierck and Staff  
Theory and application of commonly used processes. Sedimentation, coagulation, filtration, disinfection, gas transfer, activated sludge, trickling filters, oxidation ponds, sorption, and sludge stabilization and disposal. Process combinations to produce treatment systems. (Spring, even years)
- 243 **Environmental Impact Assessment** (3) Bierck and Staff  
Public policy and legislation on environmental quality. Methods for assessing impacts of engineering projects. Technology for assessing impacts on air, water, and land environments, applied to transportation facilities, water and wastewater facilities, industrial and community development. (As arranged)
- 250 **Advanced Metal Structures** (3) Toridis and Staff  
Conception, analysis, and design of low-rise and high-rise buildings by elastic and inelastic methods, suspended roofs, earthquake considerations, and unique structural systems. Prerequisite: CE 201 or equivalent. (As arranged)
- 251 **Advanced Reinforced Concrete Structures** (3) Toridis and Staff  
Conception, analysis, and design of low-rise and high-rise buildings by ultimate-strength methods, precast systems, progressive collapse, earthquake considerations, domes, folded plates, shell-type structures, and special topics. Prerequisite: CE 202 or equivalent. (As arranged)
- 253 **Reliability Analysis of Engineering Structures** (3) Sarkani and Staff  
Probability theory, theory of structural reliability, probabilistic analysis of strength and loads, risk and reliability function, empirical distribution, probability plot. The design service life, method of perturbation, Monte Carlo simulation. Fatigue and fracture, proof testing, inspection and repair-replacement maintenance. Prerequisite: approval of department. (Fall, odd years)
- 254 **Special Topics in Structural Engineering** (3) Toridis and Staff  
Selected problems, such as thermal stresses in structural systems, variational methods in structural engineering, structural design for dynamic loads and repeated loads, or advanced structural applications. Topic announced in the Schedule of Classes. May be repeated for credit. Prerequisite: CE 210 and approval of department. (As arranged)
- 255 **Introduction to Ocean and Coastal Engineering** (3) Feir and Staff  
Incompressible fluid mechanics and applications to analysis of wave motions, circulations, and other free surface flows in coastal and offshore regions; wave spectra, water-level fluctuations, tides, tsunamis, oscillations, and storm surges; wind-generated waves, beaches, sediment transport, wave forces on coastal and offshore structures. Prerequisite: ApSc 115 or equivalent. (Fall)
- 256 **Coastal Processes** (3) Feir and Staff  
Coastal sediment properties and analysis, longshore transport processes and rates; sediment budget; response of beaches to wave action and structures; tidal inlets, mechanical bypassing; beach nourishment; wind transport in sand dune stabilization, sediment tracing. Prerequisite: CE 255. (Spring, even years)
- 257 **Harbor and Coastal Engineering** (3) Feir and Staff  
Applications of principles of ocean and coastal engineering to coastal protection structures, harbor design and navigation, breakwaters, seawalls, quays, docks; sediment transport in the coastal regime, estuaries and deltas; dredging for maintenance of channels and harbors. Prerequisite: CE 255. (Spring, odd years)
- 258 **Application of Probability Methods in Civil Engineering** (3) Feir and Staff  
Uncertainty in real-world information; basic probability concepts and models; random variables; useful probability distributions, statistical estimation of distribution parameters from observed data; empirical determination of distribution models; testing hypothesis; regression and correlation analyses; decision theory. Prerequisite: ApSc 115 or equivalent. (Fall, even years)

- 261 Analysis of Plates and Shells (3)** Staff  
Bending and stretching of thin elastic plates under loading with various boundary conditions, continuous plates and plates on elastic foundations, theory of folded-plate structures. Theory of curved surfaces; general linear bending theory and its simplification to membrane theory; bending stresses in shells of revolution, shallow-shell theory. Prerequisite: graduate status. (Spring, alternate years)
- 262 Design of Plate and Shell Structures (3)** Toridis and Staff  
Design of long-span plate and shell roof structures in reinforced concrete and metal, design of containers for fluids and granular materials, computer applications in the analysis of such structures. Prerequisite: CE 201, 202, 261; or equivalent. (As arranged)
- 263 Theory of Structural Stability (3)** Toridis and Staff  
General criteria for stability, buckling of elastic and inelastic columns and frames, torsional and lateral buckling, variational methods. Buckling of plates and shells under static loads, stability of stiffened structures, effect of imperfections and boundary conditions. Prerequisite: graduate status. (Fall)
- 264 Structural Design to Resist Natural Hazards (3)** Toridis and Staff  
Prediction of forces due to earthquakes and strong winds; generalized codes; pseudostatic methods for preliminary design; codes based on spectra, energy absorption and ductility; influence of foundations; ground failures; static and aeroelastic effects of strong winds. Design project. Prerequisite: EngS 257. (Spring, alternate years)
- 265 Special Topics in Geotechnical Engineering (3)** Najjar and Staff  
Selected topics, such as rheology of soils, computer applications, excavating and tunneling, or ocean engineering problems. May be repeated for credit. Prerequisite: approval of department. (As arranged)
- 271 Theoretical Marine Hydromechanics (3)** Feir and Staff  
Derivation of the fundamental equations and boundary conditions of fluid media, application of potential-flow theory to fluid motion around two- and three-dimensional bodies, perturbation concepts. Derivation of force and movement of bodies in calm and disturbed water. Prerequisite: approval of department. Offered off campus only. (As arranged)
- 272 Microbiology for Environmental Engineers (3)** Bierck and Staff  
Principles of microbiology and applications to lakes, streams, hazardous wastes, and biological treatment systems. Methods for evaluating impacts of wastewaters and hazardous wastes on ecological systems. Concepts of limnology, including limiting of nutrients and control of nuisance growths. (Spring, even years)
- 273 Advanced Treatment Processes (3)** Bierck and Staff  
Principles and applications of advanced treatment systems for water, wastewater, and hazardous wastes, including: biological nutrient removal, oxidation-reduction processes, stripping, sorption, membrane processes, chemical precipitation, others. Prerequisite: CE 241. (Spring, odd years)
- 274 Mechanics of Water Waves (3)** Feir and Staff  
Irrotational theory for deep- and shallow-water waves, reflexion, refraction, diffraction, attenuation. Water waves of finite amplitude: shallow-water theory, tides, bores, long-waves theory, conoidal and solitary waves. Wave generation by wind. Wave breaking and reflexion. Prerequisite: ApSc 213 and permission of instructor. (Fall, even years)
- 275 Special Topics in Ocean Engineering (3)** Feir and Staff  
Selected topics, such as marine aspects of viscous-flow theory, interfacial (internal) waves, or applied random processes in ocean and coastal engineering. May be repeated for credit. Prerequisite: approval of department. (As arranged)
- 276 Water Resources Planning and Control (3)** Mahmood and Staff  
The parameters of water resources planning and control, economics of water resources and related natural resources, economics of water-quality control, physical parameters of water resource development, water resources law. Prerequisite: approval of department. (Fall, even years)
- 277 Industrial Waste Treatment (3)** Bierck and Staff  
Types of industries, waste sources. Characteristics, measurements, and evaluation. Minimization and reuse. Treatment process selection, development, and design. Regulations, permits, standards, monitoring, and pretreatment. Prerequisite: CE 240 or approval of department. (Fall, odd years)



- 278 Pollution Transport System (3)** Staff  
Distribution of pollutants in natural waters and atmosphere, diffusive and advective transport, mathematics for stream pollutant deoxygenation rates, ground-water pollution transport, sediment transport, thermal transport, numerical simulation of pollutant transports in streams and estuaries. Prerequisite: CE 193, ME 131. (Fall, even years)
- 279 Introduction to Hazardous Wastes (3)** Bierck and Staff  
Regulations, including RCRA and Superfund. Transport and fate of hazardous substances. Elements of environmental toxicology, risk assessment, and hazard ranking. Monitoring, data collection, and evaluation. Waste minimization. Case histories. Prerequisite: CE 240 or approval of department. (Spring, odd years)
- 281 Special Topics in Water Resources (3)** Mahmood and Staff  
Morphometric properties of drainage basins, drainage network analysis, hydraulic geometry of streams, advanced hydraulics of alluvial channels, modeling of drainage basins, computer applications, stochastic hydrology. Prerequisite: approval of department. (As arranged)
- 282 Hydraulic Modeling (3)** Mahmood and Staff  
Dimensional analysis and similitude. Types of models—physical, mathematical. Distortions in physical models. Erodible bed models. Prerequisite: CE 193. (Fall, alternate years)
- 283 Special Topics in Environmental Engineering (3)** Bierck  
Selected topics, such as in-depth evaluation of current issues in the field, new technological approaches for resolving environmental quality problems, environmental health matters, handling of residuals, and engineering methodologies. (As arranged)
- 284 Numerical Methods in Water Resources (3)** Mahmood and Staff  
Use of microcomputers in water resources. Elements of finite difference schemes, basic operations, convergence, stability, and consistency. Nonuniform flow and error analysis; unsteady laminar flow; diffusion problems; unsteady flow in open channels; water hammer, seepage flow, and diffusion-dispersion problems. Prerequisite: approval of department. (Spring)
- 285 Research (arr.)** Staff  
Basic research projects, as arranged. May be repeated for credit.
- 299–300 Thesis Research (3–3)** Staff
- 310 Sedimentation Engineering (3)** Mahmood and Staff  
Problems of erosion and sedimentation. Properties of sediment. Initiation of motion. Suspension of sediment and sediment discharge theories. Sedimentation measurements. Economic and legal aspects. Prerequisite: CE 212 or approval of department. (Fall, odd years)
- 311 Mechanics of Alluvial Channels (3)** Mahmood and Staff  
Physical processes in drainage basins and channels. Channel forms and bed forms. Hydraulics and sediment transport in alluvial channels. Design of stable channels. Qualitative and quantitative response of rivers. Channel stabilization, navigation channels. Case studies including environmental impacts. Prerequisite: CE 212 or approval of department. (Spring, odd years)
- 312 Advanced Hydraulics (3)** Mahmood  
Theory of unsteady flow. Diffusion and dispersion through pipes and open channels. Numerical solutions using finite element and finite difference methods. Prerequisite: CE 212 or approval of department. (Spring, even years)
- 313 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## MECHANICAL ENGINEERING

An asterisk indicates that a course is offered at NASA–Langley Research Center and may be offered on campus when arranged.

- \*201 Computational Fluid Dynamics Laboratory (1)** Staff  
Development of computer programs for solving fluid dynamics problems for incompressible and compressible inviscid and viscous flows. Prerequisite or concurrent registration: ME 277. (As arranged)

- \*202 Computational Aerodynamics Laboratory (1)** Staff  
Use of computational aerodynamics methods for conducting engineering studies of practical low-speed, transonic, and high-speed flows. Prerequisite or concurrent registration: ME 222. (As arranged)
- \*203 Experimental Techniques in Aerodynamics (3)** Staff  
The wind tunnel, instrumentation devices, boundary corrections, testing procedures, data reduction; laboratory experiments including calibration of instruments, test-section calibrations, and two-dimensional and three-dimensional model tests. Prerequisite: approval of department. (As arranged)
- 204 Advanced Instrumentation Techniques (3)** Jones and Staff  
Pressure and temperature sensors; shadowgraph, schlieren and interferometer systems; laser holography; laser Doppler velocimetry; signal conditioning, use of amplifiers; digital techniques; signal multiplexing; use of computers; error analysis and data handling. Prerequisite: approval of department. (Fall, odd years)
- \*208 Research in Computational Fluid Dynamics (1 to 3)** Staff  
Specific research projects in conjunction with experimental laboratory course or computational labs. Prerequisite: approval of department. (As arranged)
- 218 Design of Floating and Submerged Marine Vehicles (3)** Staff  
Consideration of interaction between hydrodynamics, propulsion, and configuration aspects of design of floating structures and vehicles; effects of submergence and deep submergence; hydrofoil and vertical jet action; structural considerations. Prerequisite: EngS 228. (As arranged)
- 221 Intermediate Fluid Mechanics (3)** Garriss, Mavriplis, Myers, and Staff  
Continuum, kinematics of fluids; stress and strain rate tensors; fundamental equations of viscous compressible flows. Irrotational flows; sources, sinks, doublets, and vortices. Laminar flow of viscous incompressible fluids; boundary-layer concept. Prerequisite: approval of department. (Fall)
- 222 Applied Aerodynamics (3)** Goulard, Mavriplis, and Staff  
Introduction to practical and computational methods for solving two-dimensional and three-dimensional aerodynamics problems. Linear methods, nonlinear potential methods, coordinate transforms, and boundary-layer methods. Prerequisite: EngS 284, ME 221. (As arranged)
- 225 Turbomachinery (3)** Garriss and Staff  
Turbine, compressor, and pump types and uses; dimensional analysis of turbomachines; cycle analysis of gas and steam turbines; energy interchange in fluid machinery; design, characteristics, and performance of turbines, compressors, and pumps; comparison of types of turbines, compressors, and pumps. Prerequisite: ME 221. (Fall, odd years)
- 227 Viscous Flow (3)** Goulard, Mavriplis, and Staff  
Exact solutions of Navier-Stokes equations; the laminar boundary-layer theory. Reynolds stresses and turbulence; internal, boundary-layer, and mixing flows. Applications to heat and mass transfer and to reacting flows. Prerequisite: ApSc 213, ME 221, or equivalent. (Fall, even years)
- 220 Computational Fluid Dynamics (3)** Mavriplis, Whitesides, and Staff  
Theory of discrete methods for solving the governing equations of fluid dynamics. Potential flow, Euler equations, Navier-Stokes equations. Emphasis on algorithm development appropriate to modern supercomputers. Prerequisite: EngS 284, ME 221. (As arranged)
- 231 Hydrodynamics (3)** Feir, Garriss, and Staff  
Inviscid flows in two and three dimensions and irrotational flow theory; conformal mapping and applications. Helmholtz theorems and vorticity dynamics. Applications, such as finite wing theory, instabilities. Free surface flow, Froude numbers, sheet vortex. Prerequisite: ME 221 or equivalent. (Spring)
- \*233 Aeroelasticity I (3)** Whitesides and Staff  
Static and dynamic structural deformations; static aeroelasticity (structural deformation, divergence, control effectiveness, and reversal); dynamic aeroelasticity (flutter, response to gusts and turbulence); unsteady aerodynamics for 2-D wings; strip theory for 3-D lifting surfaces; piston and Newtonian-flow theories. Prerequisite: EngS 257, ME 221. (As arranged)
- \*234 Aeroelasticity II (3)** Whitesides and Staff  
Steady and oscillating 3-D planar and nonplanar lifting surfaces in subsonic and supersonic flow. Continuous-load and discrete-load methods. Time-dependent



- motion of arbitrary configurations in subsonic, transonic, and supersonic flow. Inviscid and viscous flows. Aeroelasticity in structural design. Prerequisite: ME 233. (As arranged)
- 235 **Compressible Flow** (3) Myers, Mavriplis, and Staff  
Thermodynamics and physical properties of gases, fundamental equations of a compressible inviscid fluid, choking, small-perturbation theory, role of entropy in supersonic flow, shock-wave interactions, hodograph transformation, transonic flow theory, method of characteristics. Prerequisite: ApSc 213, ME 221, or equivalent. (Spring, even years)
- 237 **Propulsion** (3) Goulard, Cutler, and Staff  
Basic concepts of propulsion: energy transformations in propulsive flows, gas dynamics of combustion. Thermal and propulsive efficiencies. Cycle and engine component analysis. Intake, nozzle performance. Drag and thrust generation. Augmentation. Propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: ME 155 or equivalent. (Spring)
- 239 **Space Propulsion** (3) Staff  
Advanced chemical propulsion: dynamic combustion and instabilities in solid propellants. Injection, atomization, mixing in liquid propellant engine performance. Plasma propulsion: electrostatic, electromagnetic, and electrothermal instabilities (laser and microwave). Nuclear propulsion. Prerequisite: ME 237. (Fall, odd years)
- 240 **Kinematic Synthesis** (3) Kaufman and Staff  
Techniques for the analysis and synthesis of function, path, and motion generating mechanisms. Methods for the dimensional design of mechanisms. Computer-aided techniques for the optimal design of planar linkages. Review of recent developments and current research. Term project. Prerequisite: ME 190 or equivalent. (Spring, even years)
- 241 **Computer Models of Physical and Engineering Systems** (3) Kaufman and Staff  
Reduction of physical and engineering systems to simplified physical and mathematical models. Manipulation of models using PASCAL programming. Numerical algorithms for optimization, graph identification, mini-sum arithmetic, and searching. Styles of problem solving. Prerequisite: ME 117. (Spring)
- 242 **Advanced Mechanisms** (3) Kaufman and Staff  
Emphasis on spatial kinematics. Analysis and synthesis of mechanisms. Analytical techniques using matrices, dual numbers, quaternion algebra, finite and instantaneous screws, theory of envelopes. Applications to design of linkages, cams, gears. Use of digital computers in mechanism analysis and design. (Spring, odd years)
- 243 **Advanced Mechanical Engineering Design** (3) Jones and Staff  
Design of mechanical engineering systems and components, requiring the integration of engineering disciplines. Emphasis on use of computer-aided design (CAD) methods, including computer graphics and finite element analysis, and completion of a design project. Prerequisite: approval of department. (Fall)
- 245 **Robotic Systems** (3) Bedewi, Kramer, and Staff  
Classification, features, and applications of industrial robots. Special descriptions and transformations, forward and inverse kinematics. Jacobian matrix, velocities and static forces, manipulator dynamics and controls. Robot actuators, transmissions, sensors, end effectors, and programming. Prerequisite: ApSc 113, ME 182, and programming ability. (Fall)
- 246 **Electromechanical Control Systems** (3) Bedewi, Lee, and Staff  
Advanced techniques for system synthesis, compensation, and stabilization. Linear and nonlinear characterization of control components. Time domain analysis and synthesis. Introduction to digital control theory and its applications. Prerequisite: ME 182 or equivalent. (Fall)
- 247 **Seminar: Aircraft Design I** (3) Whitesides and Staff  
Designing an aircraft to specifications. Regulatory requirements, state-of-the-art limitations, computer-aided design, integration of aircraft components, economic considerations, and iterations to final configuration to obtain specified mission profile. Prerequisite: approval of department. (As arranged)
- \*248 **Seminar: Aircraft Design II** (3) Whitesides and Staff  
Aircraft design in relation to prescribed mission requirements, different configurative concepts, detail design features. Estimation of weight, size, and power of an

aircraft to satisfy mission specifications; design trade-offs and compromises. Prerequisite: approval of department. (As arranged)

**249 Spacecraft Design (3)** Staff

Computer-aided design of spacecraft and satellites to meet specific mission requirements. Environment, propulsion, structure, heat transfer, orbital mechanics, control considerations. Use of modern computer codes for design studies. Prerequisite: approval of department. (Spring, odd years)

**250 Launch Vehicle Design (3)** Staff

Computer-aided design of hypersonic launch vehicles to meet specific mission requirements. Propulsion, structures, flight path, aerothermochemistry, control considerations. Use of modern computer codes for design studies. Prerequisite: approval of department. (As arranged)

**251 Computer-Integrated Manufacturing (3)** Kramer, Shen, and Staff

Automation techniques for processing metals, polymers, and composites. Use of sensing and process modeling in process control. Numerical control and robot applications and limitations. Integration, scheduling, and tool management in the computer-integrated factory. Quality control. Social and economic considerations in CIM. Prerequisite: ME 192 or equivalent. (Fall)

**252 Projects in Computer-Integrated Design and Manufacturing (3)** Kramer, Shen, and Staff

Applications of the concepts of computer-integrated manufacturing to group projects, culminating in written and oral presentations. Robot programming, vision-guided assembly, force sensing, fixturing, and end-effector design for practical applications. Factory simulation, part scheduling, and NC program-verification algorithms. Prerequisite: ME 251. (Spring)

**253 Tribology (3)** Kramer and Staff

Fundamentals of the friction, wear, and lubrication of metals, polymers, and ceramic and composite materials. Theories of friction and wear, techniques for surface characterization, wear coatings, solid and boundary lubrication. Tribological problems in the application of ceramic components. Prerequisite: CE 166 or equivalent. (As arranged)

**257 Energy Systems Analysis I (3)** Kiper and Staff

Analysis of energy resources and conversion devices. Statistical data analysis, forecasting, I/O, and net energy analyses, mathematical modeling. Prerequisite: approval of department. (Fall)

**258 Energy Systems Analysis II (3)** Kiper and Staff

Life-cycle costing, Second Law (energy) analysis, technological assessment, computer-assisted synthesis (CAS), society-technology interfaces. It is recommended that ME 257 and 258 be taken in sequence. Prerequisite: approval of department. (As arranged)

**259 Solar Heating Systems (3)** Kiper and Staff

Methods of solar energy collection and storage. Theory of flat-plate collectors, solar energy system analysis, design of solar water-heating and space-heating systems, economics of solar heating systems. Passive solar heating systems. Solar industrial process heat. Prerequisite: ME 187 or equivalent. (Fall, odd years)

**260 Heating and Air-Conditioning of Buildings (3)** Kiper and Staff

Heating and cooling load calculations, system design and energy consumption analysis. Codes and standards for building energy management, energy conservation. Heating and air-conditioning systems; central-control systems. Cost estimates. Prerequisite: ME 187 or equivalent. (Spring)

**261 Air Pollution (3)** Goulard and Staff

Introductory course on the generation, monitoring, and control of air pollution. Atmospheric pollutants; current levels and health problems. Combustion chemistry and mixing. Photochemical processes; smog and measurements. Atmospheric dispersion; inversion and acid rain. Prerequisite: approval of department. (Fall, odd years)

**\*269 Wind Tunnel Research Techniques (3)** Cutler and Staff

A comprehensive survey of wind tunnel research facilities and techniques. Subsonic, transonic, supersonic, and hypersonic facilities. Basic principles of wind tunnel design and associated research equipment. Data acquisition and reduction, research methods, static and dynamic testing techniques. Prerequisite: approval of department. (Spring)



- 270 **Aerodynamics of Flight Vehicles (3)** Whitesides and Staff  
Aerodynamic loads on flight vehicles, interference effects, application of aerodynamic theory to aircraft design, studies of aircraft dynamics and performance. Prerequisite: approval of department. (Spring)
- \*271 **VTOL Aircraft Technology (3)** Whitesides and Staff  
Fundamental principles of VTOL aircraft. Hovering performance based on momentum theory, analysis of jet-induced interference effects, transition aerodynamics, theoretical stability and control and correlation with flight data, ground-effect theory and experiment, handling-qualities criteria. Prerequisite: approval of department. (Spring)
- \*272 **Powered-Lift Technology (3)** Whitesides and Staff  
Basic principles of powered-lift aircraft. High-lift aerodynamics, low-speed stability and control, fundamentals of internally blown and externally blown powered-lift concepts, the spanwise blowing scheme to delay wing stall. Use of powered lift for improved maneuverability of fighter aircraft, aerodynamic ground effects. Prerequisite: approval of department. (Fall)
- 273 **Principles of Automatic Flight Control (3)** Klein and Staff  
Design of aeronautical instrumentation and feedback controls; mathematical models of sensors, controllers, and actuators; theory of feedback control, stability, accuracy, and speed of response; equalization effects of nonlinearities and noise. Prerequisite: approval of department. (Spring)
- 274 **Dynamics and Control of Spacecraft (3)** Goulard and Staff  
Fundamentals of satellite attitude dynamics, stabilization, and control. Spacecraft attitude determination and control of spinning and three-axis stabilized spacecraft. Elements of linear control theory for single-input, single-output systems, and basic feedback control laws for attitude stabilization. Prerequisite: Approval of department. (Spring, even years)
- 275 **Stability and Control of Aircraft (3)** Goulard, Tolson, and Staff  
Derivation of equations of motion, Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques, and frequency-response analysis. Prerequisite: approval of department. (Fall)
- 276 **Mechanics of Space Flight (3)** Staff  
Two-body problems, including orbital elements, universal variables, orbit determination, Kepler's equations, orbit transfers, and Lambert's theorem. Orbital perturbation, variation of parameters, drag and oblateness effects. Prerequisite: EngS 217 or approval of the department. (Fall, even years)
- 279 **Special Topics in Flight Sciences (3)** Staff  
Prerequisite: approval of department.
- 280 **Intermediate Thermodynamics (3)** Kiper and Staff  
Macroscopic and microscopic descriptions of thermodynamic systems. Conditions of equilibrium and stability of thermodynamic systems. Review of methods of statistical thermodynamics. Properties of perfect gases and crystals. Review of elements of kinetic theory and transport phenomena. Selected applications. Prerequisite: approval of department. (Fall)
- 281 **Advanced Thermodynamics (3)** Kiper and Staff  
The concept of ensembles; Boltzmann, Fermi-Dirac, and Bose-Einstein statistics; balance and entropy-production equations. Linear and nonlinear, nonequilibrium thermodynamics. Benard instability and fluctuation theory. Integration of subjects using information theory; computational techniques. Prerequisite: ME 280 or equivalent. (As arranged)
- 285 **Special Topics in Mechanical Engineering (3)** Staff  
Prerequisite: approval of department. (As arranged)
- 287 **Heat Conduction (3)** Goulard and Staff  
Conduction of heat through solid, liquid, and gaseous media. Formulation and methods of analytical, numerical, and analog solutions. Steady two- and three-dimensional problems, problems in unsteady heat conduction. Conduction in composite regions. Prerequisite: ApSc 213 or equivalent. (Fall, even years)
- 288 **Convective Heat and Mass Transfer (3)** Goulard and Staff  
Heat and momentum transfer in laminar and turbulent flow. The laminar boundary-layer solution. Similarity and nondimensional parameters. Mass-momentum

heat transfer analogy. Convective heat transfer at high velocity. Stability, transition, and turbulence. Free convection. Prerequisite: ME 221 or equivalent. (Spring, odd years)

- 289 Radiative Heat Transfer (3)** Goulard and Staff  
Thermal radiation; laws of intensity attenuation and generation. Solid angles and frequency spectrum. Surface properties and view factors; design of furnaces and radiant boilers. Optical temperature diagnostics; remote sensing. Prerequisite: approval of department. (Fall, odd years)

- 291 Power Systems (3)** Kiper and Staff  
Design of thermal power system components and system optimization. Heat balance studies, options for improved cycle efficiencies, component selection and design, safety and pollution regulations. Survey of electric power system technology. Prerequisite: ME 187 or equivalent. (Fall, even years)

- 293 Combustion (3)** Garriss, Goulard, and Staff  
Basic combustion phenomena. Rate processes and chemical kinetics. Chain reaction theory. Detonation, deflagration, diffusion flames, heterogeneous combustion. Experimental measurements. Impact of pollution regulations and alternate fuels. Prerequisite: approval of department. (Spring, even years)

- 295 Statistical Thermodynamics (3)** Kiper and Staff  
Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; partition functions, correspondence between classical and statistical thermodynamics. Systems with negligible effects of interparticle forces; perfect gases. The Debye solid, the Einstein solid. Prerequisite: ME 280. (As arranged)

- 296 Special Topics in Heat and Mass Transfer (3)** Goulard and Staff  
Prerequisite: approval of department. (As arranged)

- 297 Special Topics in Fluid Mechanics (3)** Staff  
Prerequisite: approval of department. (As arranged)

- 298 Research (arr.)** Staff  
Research as arranged. May be repeated for credit.

- 299-300 Thesis Research (3-3)** Staff

- 311 Nonsteady Flow (3)** Garriss and Staff  
Fundamental equations of nonsteady viscous flow. Characteristics and waves, initial and boundary conditions. Piston theory and the oscillating airfoil. Nonsteady flows with entropy production. Gas dynamics of nonsteady combustion. Prerequisite: ME 235 or 237, or equivalent. (As arranged)

- 312 Theory of Turbulence (3)** Goulard and Staff  
Concept of turbulence, transition and linear theory of flow stability, experimental observations on turbulence generation, turbulent kinetic energy distribution, statistical description of turbulence, mean turbulent energy and Reynolds stress closure models, turbulent shear flows in free turbulence and wall turbulence. Prerequisite: ME 227. (As arranged)

- 315 Hypersonic Flow (3)** Goulard and Staff  
Shock waves in hypersonic limits, one-dimensional piston problem, and method of characteristics. Hypersonic small-disturbance theory. Unsteady and similarity parameters. Newtonian flow theory for slender and blunt bodies. Hypersonic viscous interaction phenomena. Prerequisite: ApSc 211, ME 235. (As arranged)

- 317 Physical Gas Dynamics (3)** Staff  
Molecular and atomic phenomena in gases, intermolecular forces, specific heats, equation of state for a real gas, dynamics of dissociating gas, radiation. Prerequisite: ME 235, 295, or equivalent. (As arranged)

- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## ENGINEERING SCIENCE

Courses designated "As arranged" are not offered on a regular basis. An asterisk indicates that a course is offered at NASA-Langley Research Center and may be offered on campus when arranged.



- 201 Introduction to Manufacturing (3)** Kramer, Shen, and Staff  
Fundamentals of modern manufacturing. Processes for manufacturing mechanical and electronic components from metals, polymers, ceramics, and silicon. Manufacturing systems, CAD, robotics, and design for assembly. Current capabilities, technological needs, and competitiveness. Examples from high-tech industries. Prerequisite: approval of department. (As arranged)
- 208 Energy Conservation (3)** Kiper and Staff  
Conservation methods in the home, in transportation, and in industrial manufacturing and commercial sectors. Second law of thermodynamics from a conservation viewpoint. Construction methods for low energy consumption in large and small edifices. Environmental effects. Prerequisite: approval of department. (As arranged)
- 215 Advanced Strength of Materials (3)** Staff  
Deflection of beams using singular functions, unsymmetrical bending of beams, beams on elastic foundation. Beam-column problems, shear center for thin-walled beam cross sections, curved beams. Applications of energy methods, torsion, basic equations for theory of elasticity, thin- and thick-walled cylinders, stress concentration, and failure criteria. Prerequisite: CE 120. (Spring)
- 217 Analytical Mechanics (3)** Eftis, Haque, and Staff  
Fundamental principles, generalized coordinates, variational principles and Lagrange's equations, nonholonomic systems, Hamilton's equations, theory of small oscillations. Prerequisite: approval of department. (As arranged)
- 218 Introduction to Continuum Mechanics (3)** Eftis, Haque, and Staff  
Kinematics of a continuum, equations of motion, linear isotropic elastic solid, Newtonian viscous fluid, integral formulation of general principles, simple applications. Prerequisite: approval of department. (Fall)
- 221 Theory of Elasticity I (3)** Eftis and Staff  
Introduction to Cartesian tensors; deformation, stress, constitutive relations for linear elasticity; formulation of boundary value problems; variational principles, torsion and bending of prismatic rods, plane problems. Prerequisite: Approval of department. (Spring)
- 222 Theory of Elasticity II (3)** Eftis and Staff  
Application of integral transform and analytic function theory to solution of plane problems; elastic wave propagation. Three-dimensional elasto-statics. Prerequisite: ApSc 211; EngS 221. (Fall, odd years)
- 228 Physical Oceanography (3)** Feir and Staff  
Seawater, equations of motion, interaction between air and sea, currents, wind waves in deep and shallow waters, long ocean waves, tides, wave statistics, sea ice. Prerequisite: ME 221 or equivalent. (As arranged)
- 229 Transformations in Materials (3)** Gilmore and Staff  
Thermodynamics of multiphase systems, nucleation, crystal growth, solidification, precipitation, solution of moving boundary problems, spinodal decomposition, effects of stress on equilibrium, surface effects on transformations, martensite crystallography and thermodynamics. Prerequisite: EngS 231. (Spring, odd years)
- 231 Structure and Transformations in Materials (3)** Gilmore and Staff  
Structure of crystals, crystal binding, crystal defects, dislocations, solid solutions, phases, diffusion, phase transformations, deformation twinning, and martensite. Prerequisite: CE 140. (Fall, even years)
- 233 Mechanics of Composite Materials (3)** Staff  
Stress-strain relationship for orthotropic materials. Invariant properties of an orthotropic lamina, biaxial strength theory for an orthotropic lamina. Mechanics of materials approach to stiffness, elasticity approach to stiffness. Classical lamination theory, strength of laminates. Statistical theory of fatigue damage. Prerequisite: approval of department. (Spring, odd years)
- 234 Composite Materials (3)** Gilmore and Staff  
Principles of composites and composite reinforcement. Micromechanics and failure, interface reactions in various composites, reinforcing materials. Structure of composites: fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of department. (Spring, even years)

- 236 **Experimental Techniques in Materials Science** (3) Gilmore and Staff  
Sample preparation. Optical microscopy. X-ray diffraction. Electron probe microanalysis. Scanning and transmission electron microscopy. Field ion microscopy. Prerequisite: CE 140. (Spring, odd years)
- 237 **Environmental Effects on Materials** (3) Gilmore and Staff  
Aqueous corrosion, electrochemistry, electrochemical reactions, polarization. Environmental factors, intergranular corrosion, stress corrosion, high-temperature corrosion. Kinetics and mechanisms of corrosion, oxidation, liquid metal corrosion, irradiation effects. Prerequisite: approval of department. (Fall, even years)
- 240 **Fracture Mechanics** (3) Jones, Liebowitz, and Staff  
Fundamentals of brittle fracture, Griffith theory and extensions, mechanics of fracture. Linear elastic systems, plasticity considerations, fracture toughness. Engineering analysis, notch-strength analysis with limit approach, crack-propagation laws, fatigue, fracture testing. Prerequisite: EngS 221 or CE 261. (Spring, even years)
- 241 **Deformation and Failure of Materials** (3) Gilmore and Staff  
Elastic and plastic deformation, yield, dislocation theory, strengthening mechanisms, creep, polymers, fracture, transition temperature, microstructure, fatigue.
- 242 **Materials Recycling and Recovery** (3) Gilmore, Lamb, and Staff  
Techniques and technologies for recovering and reusing waste materials. Relationships of recycling and waste reduction to energy conservation and environmental impact; legal, economic, institutional, and environmental policy aspects of recycling and waste reduction. Prerequisite: approval of department. (As arranged)
- 248 **Special Topics in Engineering Science** (3) Staff  
Prerequisite: Approval of department. (As arranged)
- 249 **Special Topics in Materials Science** (3) Gilmore and Staff  
Prerequisite: approval of department. (As arranged)
- 256 **Plasticity** (3) Eftis and Staff  
Introduction to the continuum theory of plastic deformation. Physical basis of rate-independent plasticity. Concepts of yield, strain hardening and softening, reverse yield, and cyclic plasticity. Constitutive equations describing plastic deformation. Prerequisite: EngS 215 or 218. (Spring, odd years)
- 257 **Theory of Vibrations** (3) Lee, Toridis, and Staff  
Damped and undamped natural vibration, response of single- and multiple-degrees-of-freedom systems to steady-state and transient excitations, modal analysis, nonproportional damping and complex modes, variation formulation of equations of motion, discretization of structural systems for vibrational analysis. Prerequisite: approval of department. (Fall)
- 258 **Structural Dynamics** (3) Sarkani and Staff  
Vibration of continuous systems: membranes, beam plates, and shells; approximate methods of vibration analysis; methods of integral transform; analysis of nonlinear systems; wave propagation. Prerequisite: EngS 257 or approval of department. (Fall, odd years)
- 259 **Random Vibration of Structures** (3) Sarkani and Staff  
Introduction to random processes, responses of linear structures to stationary and nonstationary random inputs. Structural responses to earthquakes, waves, boundary-layer turbulences, wind loads, etc. Failure analysis of structures under random loads. Prerequisite: ApSc 115 or CE 258. Prerequisite or concurrent registration: EngS 257. (Spring, even years)
- \*270 **Theoretical Acoustics I** (3) Myers and Staff  
Basic acoustic theory in stationary and uniformly moving media; waves in infinite space; sound transmission through interfaces; sound radiation from simple solid boundaries, source and dipole fields; propagation in ducts and enclosures; elements of classical absorption of sound. Prerequisite: ApSc 213, ME 221. (As arranged)
- 271 **Random Process Theory** (3) Staff  
Random processes; stationarity and ergodicity; mean-square calculus; auto- and cross-correlations and spectra; random processes in linear systems; mean-square estimation, prediction, and filtering; zero and level crossings and peak distributions; applications in aerospace sciences. Prerequisite: approval of department. (As arranged)



- \*273 Time Series Analysis (3)** Myers and Staff  
Harmonic analysis of random signals; auto- and cross-correlations and spectra; coherence; modern techniques for spectral estimation, including fast Fourier transform, maximum entropy, and maximum likelihood; bias and variability; randomly sampled data; digital filtering; applications. Prerequisite: EngS 271 or approval of department. (As arranged)
- 274 Environmental Noise Control (3)** Staff  
Introduction to the physical effects of noise and vibration on humans, practical sources of noise and their control. Building, ventilation-system, mechanical-equipment, aircraft, automobile, and truck noise. Factors affecting vibration levels and vibration control by structural design, damping, and isolation. Prerequisite: EngS 270, ME 215. (As arranged)
- \*275 Theoretical Acoustics II (3)** Myers and Staff  
General theory of sound propagation in homogeneous media, viscous and heat conduction effects; inhomogeneous wave equation; sound radiation; sources, dipoles, quadrupoles; radiation from moving sources; scattering and diffraction of sound by obstacles; acoustics of inhomogeneous media, geometric acoustics. Prerequisite: EngS 270. (As arranged)
- \*280 Special Topics in Acoustics (3)** Staff  
Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people, and communities to noise. Prerequisite: approval of department. (As arranged)
- 282 Computer-Aided Design (3)** Toridis and Staff  
Fundamental concepts in the development of computational algorithms for the design of structures, machine components and assemblies, and other engineering systems. Representation of the design process and design specifications as a network of decision tables and logical flags. Optimization techniques and algorithms in design applications. Prerequisite: CSci 50, CE 210. (Fall)
- 283 Application of Computer Graphics in Engineering (3)** Toridis and Staff  
Automatic generation and display on CRT screen of geometrical shapes consisting of a grid of discrete points interconnected by user-selected geometric shapes. Automatic mesh generation, transformations, projections, and the concept of "hidden" lines. Interactive computer-graphics applications. Prerequisite: CSci 50 or equivalent; or concurrent registration: EngS 284. (Spring)
- 284 Numerical Methods in Engineering (3)** Toridis and Staff  
Eigenvalue problems. Numerical solution of systems of equations and ordinary differential equations. Solution techniques for elliptic, parabolic, and hyperbolic partial differential equations. Numerical methods for solving finite element equations. Introduction to solution of fluid-flow problems. Prerequisite: CE 117 or ME 117, or approval of department. (Fall)
- 285 Finite Element Methods in Engineering Mechanics (3)** Toridis and Staff  
Calculus of variations. Variational formulation of the finite element method. Weighted residual techniques. Computer implementation of the finite element method. Application to problems in heat transfer, stress analysis, fluid flow, and structural analysis. Prerequisite: approval of department. (Spring)
- \*286 Analysis and Design of Thin-Walled Structures (3)** Staff  
Statics of thin-walled beams and panels, force interplay between stiffeners and skin in the analysis and design of stiffened thin-walled structures. Strength and stiffness of locally buckled stiffened structures. Design considerations. Critical evaluation of various design procedures. Prerequisite: approval of department. (As arranged)
- 288 Advanced Finite Element Methods in Structural Mechanics (3)** Toridis and Staff  
Review of variational formulation of the finite element method. Formulation of various continuum and structural elements. Application to static and dynamic problems in elasticity, plasticity, large deflection, and instability in plates and shells. Recent developments in finite element methods. Prerequisite: CE 210, EngS 285. (As arranged)
- 289 Special Topics in Theoretical and Applied Mechanics (3)** Eftis, Haque, and Staff  
Prerequisite: approval of department. (As arranged)
- 290 Research (arr.)** Staff  
Basic research projects as arranged. May be repeated for credit.
- 299-300 Thesis Research (3-3)** Staff

- \*310 Aeroacoustics (3)** Myers and Staff  
General theory of aerodynamic sound generation and propagation. Lighthill's formulation of jet noise, similarity laws, supersonic and subsonic jet noise, boundary-layer noise, fan and compressor noise, helicopter noise, sonic booms. Current problems in aeroacoustics. Prerequisite: EngS 275. (As arranged)
- \*311 Nonlinear Acoustics (3)** Myers and Staff  
Finite amplitude waves and waves in moving stratified media. Interaction between linear and nonlinear waves, wave propagation through nonlinear media, applications to transmission of sound through ducts with flow and absorbing walls. Prerequisite: approval of department. (As arranged)
- 314 Advanced Numerical Methods (3)** Staff  
Finite difference, finite element, and spectral methods for elliptic, parabolic, and hyperbolic differential-equation systems. Parallel- and array-processing techniques. Nonlinear equations. Prerequisite: ApSc 213, EngS 284. (As arranged)
- 315 Nonlinear Mechanics of Continua (3)** Eftis and Staff  
Polar decomposition, invariance, isotropy, representation theorems for invariants and isotropic tensor functions. Deformation, kinematics, stress, balance principles. Principles for constitutive relations. Applications to nonlinear elasticity and non-Newtonian fluids. Prerequisite: Approval of department. (As arranged)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## COMMUNICATION STUDIES

Through the National Center for Communication Studies, the University and the Graduate School of Political Management in New York City have engaged in a five-year cooperative arrangement that offers a Washington Degree Program leading to a Master of Professional Studies degree in political management. The George Washington University provides facilities and support for this program, but the admissions and curriculum requirements as well as the faculty of the program are those of the Graduate School of Political Management, in whose name the degree is offered. Information about the program is available from the Graduate School of Political Management, which maintains an office within the National Center for Communication Studies.

Students in the Washington Degree Program may enroll in graduate or undergraduate courses of the University, and students in other programs of the University may enroll in courses offered by the Washington Degree Program, this enrollment subject in both instances to space availability, the curricular requirements of the student's course of study, and approval of the student's major advisor.

Registration in courses of the Washington Degree Program is accomplished through specially designated courses of the political communication program of the National Center for Communication Studies. Students should consult with the Washington Degree Program office for information about the correspondence between these course numbers and the curriculum of the Graduate School of Political Management.

## POLITICAL COMMUNICATION

### 280 Selected Topics in Political Management (3)

Under this designation, qualified GW students may register for courses of the Washington Degree Program. Interested students should consult the Bulletin of the Graduate School of Political Management for specific descriptions. Topics include quantitative analysis (quantitative methods for political managers, statistical analysis of political data, quantitative analysis and political strategy, research and data collection); techniques of politics (computer applications for political managers, polling, political management and the media, qualitative research, advanced computer applications in politics, fundraising, fundraising for organizations); lobbying and government relations (fundamentals of lobbying, lobbying and the budget process, managing government relations and public



affairs programs, advanced lobbying strategy; corporate, labor, and public interest lobbying; lobbying and the executive branch, tutorial on lobbying strategy); campaign management (fundamentals of campaign management, campaign advertising and promotion, campaign organization, campaign strategy and management, campaign finance, political communications strategy, strategic factors in presidential campaigns, tutorial on campaign planning); and issues management (fundamentals of issues management, public opinion dynamics, strategic management of political issues).

**281 Field Experience in Political Management (3 to 6)**

Open only to students enrolled in the Washington Degree Program of the Graduate School of Political Management. Students spend at least 20 hours per week in an approved agency or office, performing professional work in the subject under the general guidance of a faculty advisor.

**285 Independent Study in Political Management (1 to 6)**

Open only to students enrolled in the Washington Degree Program of the Graduate School of Political Management. An intensive exploration into a single aspect of political management.

**289 Thesis in Political Management (8)**

Open only to students enrolled in the Washington Degree Program of the Graduate School of Political Management.

**290 Selected Topics in Political Communication (3)**

Readings, research, and/or discussion on specialized topics. May be repeated for credit with approval of the graduate advisor provided the topic differs.

## COMPUTER AND INFORMATION SYSTEMS

See *Statistics/Computer and Information Systems*.

## COMPUTER SCIENCE

See *Electrical Engineering and Computer Science*.

## COUNSELING

See *Human Services*.

## CRIME IN COMMERCE

See *Forensic Sciences*.

## CRIMINAL JUSTICE

See *Forensic Sciences*.

## DANCE

See *Theatre and Dance*.

## DRAMA

See *Theatre and Dance*.

## EAST ASIAN LANGUAGES AND LITERATURES

### CHINESE

**271-72 Poetry of the Tang and Song Periods (3-3)**

Reading of works of leading poets. Discussion of content and style. Prerequisite: Chin 109 or equivalent. (Alternate academic years) Chaves

**273 Chinese Drama (3)**

Readings of plays by Guan Han-qing, Ma Zhi-yuan, and others. Prerequisite: Chin 109 or equivalent. Shih

- 277-78 **Prose Narratives of the Song, Ming, and Qing Periods** (3-3) Shih  
 Short stories of the Song period. Selected readings of Ming/Qing novels. Historical development and stylistic traits. Prerequisite: Chin 107 or equivalent.  
 (Alternate academic years)
- 299-300 **Thesis Research** (3-3)

### EAST ASIAN STUDIES

**Program Committee:** W.R. Johnson (Director), Y.C. Kim, C.W. Shih, G. Sigur, R. Thornton, R.Y. Yin

The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of East Asian studies.

**Master of Arts in the field of East Asian studies**—Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School.

The program is available in a 30-credit-hour option with a thesis or a 36-credit-hour option without a thesis. Students electing the nonthesis option must prepare a substantial research paper in a two-semester readings research course. (In the concentration in Chinese language and literature, only the thesis option is available.) Students with no previous course work in the modern history and politics of China and Japan may need to take additional courses beyond the minimum required for the degree to acquire this background. A reading knowledge of Chinese, Japanese, or another approved East Asian language must be demonstrated. Credit for language study is not counted toward degree requirements.

Students must complete course work related to East Asia in at least four of the following Departments: East Asian Languages and Literatures, Economics, Geography and Regional Science, History, and Political Science. (Those who choose the concentration in Chinese language and literature are excepted.)

Students in the thesis program must pass Master's Comprehensive Examinations in two fields, one in a major field (12 credit hours) and one in a minor field (6 credit hours). Students in the nonthesis program must pass the Examinations in three fields if they select one major field and two minor fields and in two fields if they select two major fields.

**Concentration in Chinese language and literature**—only the thesis option is available. Students must take 12 credit hours of Chinese literature and pass a Master's Comprehensive Examination in this major field. They must also take 6 hours of history courses and 6 hours of additional courses that pertain to East Asian studies and must pass a Master's Comprehensive Examination in one of these two minor fields.

The following graduate courses pertain to East Asian studies.

- Chin 271-72 *Poetry of the Tang and Song Periods*
- Chin 273 *Yuan Drama*
- Chin 277-78 *Prose Narratives of the Song, Ming, and Qing Periods*
- Econ 269-70 *Economy of the People's Republic of China*
- Econ 271 *Economy of Japan*
- Geog 266 *Seminar: Geographic Perspectives on Contemporary China*
- Hist 253-54 *Readings Seminar: History of Sino-Soviet Relations*
- Hist 255-56 *Readings Seminar: U.S.-Soviet Strategic Relations Since World War II*
- Hist 259-60 *Research Seminar: Problems in U.S.-Soviet-Chinese Relations*
- Hist 289 *Readings Research Seminar: Modern Japanese History*
- Hist 293 *Research Seminar: Modern East Asian History*
- Hist 295-96 *Readings Seminar: Modern East Asian History*
- IAff 291 *Colloquium: East Asia*
- PSc 270-71 *Politics of the People's Republic of China*
- PSc 272 *Foreign Policy of the People's Republic of China*
- PSc 274 *Governments and Politics of Japan and Korea*
- PSc 275 *International Politics of East Asia*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.



## ECONOMICS

Professors J.W. Kendrick (Emeritus), C.T. Stewart, Jr. (Emeritus), J. Aschheim, H. Solomon, S. Levitan (Emeritus), J.L. Gastwirth, M.A. Holman, R.M. Dunn, Jr., S.E. Haber, R.S. Goldfarb, O. Havrylyshyn, A.M. Yezer, J.J. Cordes (Chair), J. Pelzman, J.E. Kwoka, R.P. Trost, B.L. Boulier, H.S. Watson, M.D. Bradley

Adjunct Professors T.F. Carroll, P. Swamy, J. Hardt, E.H. Solomon, D.J. Rousslang, K. Flamm

Professorial Lecturer S.N. Kirby

Associate Professors R.Y. Yin, S.C. Smith, A. Klammer, R.F. Phillips, A.S. Malik

Adjunct Associate Professor M.A. Baily

Assistant Professors V. Fon, F.L. Joutz, M.O. Moore, S.M. Suranovic, H. Courtney, B. Drees, N. Vonortas, S. Joshi

*Master of Arts in the field of economics*—Prerequisite: (1) a Bachelor of Arts degree with a major in economics or with course work in economics that includes intermediate microeconomic and macroeconomic theory (equivalent to Econ 101, 102 or 217-18); (2) an understanding of basic calculus, equivalent to Math 31-32 or 41-42. Applications are accepted for the fall semester only.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including (1) Econ 203-4, 205, and 275; (2) 12 additional credit hours to be selected from other third-group economics courses; (3) a Master's Comprehensive Examination in economic theory; and (4) either a thesis (Econ 299-300) or 12 credit hours selected from additional third-group economics courses. In some cases, up to 6 credit hours in courses outside the Department may be substituted for certain of the above requirements when it is deemed clearly important to the candidate's area of study.

*Five-Year Bachelor of Arts/Master of Arts in the field of economics*—See the Undergraduate Programs Bulletin.

*Five-Year Bachelor of Science (Systems Analysis and Engineering)/Master of Arts in the field of economics*—See the Undergraduate Programs Bulletin.

*Doctor of Philosophy in the field of economics*—The Ph.D. program involves study in two sequential units. Unit I includes satisfactory completion of required course work, and passing the General Examination. This first unit must be concluded within five years after entry into the program. Upon successful completion of Unit I, students are considered for admission to Unit II, the dissertation stage, which must be completed within five years after entry. In all cases, however, the student is expected to complete the doctorate within eight years after admission. Students admitted to the second unit will be recommended by the Department of Economics for the Master of Philosophy degree.

Students must meet the general requirements stated under Columbian College and Graduate School of Arts and Sciences. For Unit I, the requirements include Econ 202, 203, 204, 205, 206, 215, 216, and 275, plus 24 additional credit hours of approved graduate course work, and passing the General Examination in microeconomic theory, macroeconomic theory, and two other fields selected by the student and approved by the doctoral program committee. Examinations are given in the following fields: econometrics, economic development, environmental and natural resource economics, health economics, history of economic thought, industrial organization, international economics, labor economics, monetary theory and policy, public finance, regional and urban economics, and Soviet and East European economics.

Examinations: the field examinations that constitute the General Examination are given at least two times per year. The requirements for the microeconomic and macroeconomic theory examinations must be met before any other field examinations may be taken. Students are strongly advised to take the microeconomic and macroeconomic theory examinations within two years of entering the program. To pass the General Examination, students must earn a grade of "satisfactory pass" or better in the field examination in microeconomic or macroeconomic theory and in one of the other two field examinations and no grade below "bare pass." Two of the field examinations may be taken a second time with the approval of the department and the dean. No further opportunity to take the examinations is permitted. Substitution of a field examination (in an area not originally chosen by the student) to satisfy the requirements of the General Examination is equivalent

to taking a field examination a second time. Students should consult with the professors responsible for their fields and notify the department two months in advance of their intention to take the examinations. If such notification is not given sufficiently in advance, it may not be possible to sit for the examination.

For Unit II, the requirements include formulation of an acceptable dissertation proposal, completion of a dissertation that demonstrates the candidate's ability to do original research, and 24 hours of additional graduate course work, of which at least 12 hours must be dissertation research. Students, including those who have an accepted dissertation proposal, must enroll in a dissertation proposal seminar (Econ 397) in the first semester after promotion to Unit II. Satisfactory performance in the seminar will be equivalent to 3 credit hours of Unit II course work. In cases where knowledge outside the discipline of economics is critical to the student's research field, up to 6 credit hours in Unit II may consist of required courses outside the Economics Department.

**Departmental prerequisite:** Graduate courses in economics (except 214, 217-18, 221-22, 243, 247, 249, 283, 284) are designed for graduate students in economics. Graduate students in other disciplines may register for third-group courses after having completed Econ 217-18 or 101 and 102, unless the course description indicates that these prerequisites have been waived. Intermediate-level micro and macro courses taken elsewhere usually satisfy this requirement, but introductory or first-year courses do not. In addition to these prerequisites and any others specific to the particular course, calculus is required in some sections of graduate economics courses.

Courses at the 300 level are offered as the demand warrants and may be repeated for credit.

- 202 History of Economic Thought (3)** Klammer  
Critical analysis and interpretation of the development of economic theory from Plato through the formulation of the Neoclassical Synthesis paradigm and contemporary revisions of the Neoclassical Synthesis. (Fall)
- 203-4 Microeconomic Theory (3-3)** Fon, Joshi  
Econ 203: Demand, production, cost theory. Prerequisite: Econ 101 or equivalent.  
Econ 204: Market structure, welfare, general equilibrium. Prerequisite: Econ 203. (Academic year)
- 205 Macroeconomic Theory I (3)** Bradley, Joutz  
Alternative theories of income, employment, and the price level; fiscal and monetary policy impacts; the role of expectations in the economy. (Spring)
- 206 Macroeconomic Theory II (3)** Bradley, Joutz  
Continuation of Econ 205. Extensions of alternative models of income determination; application of analytic frameworks to the U.S. economy; examination of uncertainty and policy strategy. (Fall)
- 208 National Income, Product, and Productivity (3)** Kendrick  
Output, input, and productivity relationships by industry; income, outlay, flow-of-funds, and balance sheets by sector; uses of accounts for analysis and projections. (Fall)
- 214 Survey of Mathematical Economics (3)** Fon  
Primarily for graduate students in fields other than economics. Students in economics should consult the instructor before taking this course. Differentiation, partial differentiation, and economic optimization problems; comparative statics; input-output analysis; difference, differential equations, and economic applications. Prerequisite: one semester of calculus and Econ 217-18.
- 215-16 Mathematical Economics (3-3)** Fon  
Formulation and application of mathematical models in economic theory. Prerequisite: a one-year calculus sequence. Open to undergraduates with permission of instructor. (Academic year)
- 217-18 Survey of Economics (3-3)** Goldfarb, Holman, Watson, Bradley, Fon, Joutz, Malik, Phillips  
Intermediate-level microeconomic theory (Econ 217) and intermediate-level macroeconomic theory (Econ 218) for graduate students in fields other than economics. (Econ 217 and 218—fall and spring)
- 219 Managerial Economics (3)**  
Intermediate microeconomic theory, with emphasis on production and costs, market structure and pricing, risk analysis, and investment theory and capital budgeting. Offered off-campus only. (Fall and spring)



- 221-22 **Economics Applied to Public Policy: Theory and Method (3-3)** Staff  
An extension of microeconomic welfare analysis to the study of contemporary policy issues. Resource allocation decisions in the public sector; models of individual choice making in policy analysis; and policy aspects of production, cost, and organizational decision making. Primarily intended for students in fields other than economics. Prerequisite: Econ 217. (Academic year)
- 223-24 **Monetary Theory and Policy (3-3)** Aschheim, Drees  
Theory of monetary policy within the framework of contemporary American central banking. (Academic year)
- 233 **Urban and Rural Development Policies (3)** Carroll  
Review of urban and rural development strategies in the LDCs. Theories and experiences of land reform, peasant cooperatives, small-farm technology, rural-urban linkages, and planning a service network. (Fall)
- 237 **Economics of the Environment and Natural Resources (3)** Malik  
Analysis of public policy problems relating to the environment and natural resources development and management. (Spring)
- 239 **Economics of Defense (3)** H. Solomon  
Economic analysis applied to national security planning and objectives. Analysis of defense establishment problems, including manpower, the defense industry base, procurement policy. (Spring)
- 241-42 **Labor Economics (3-3)** Goldfarb  
Theory of wages and employment, analysis of labor supply and demand. Analysis of unemployment; unions; wage regulation. Econ 241 is prerequisite to Econ 242. (Academic year)
- 245-46 **Industrial Organization (3-3)** Kwoka  
Econ 245: Economic theory and evidence regarding industrial market structure, conduct, and economic performance. Econ 246: Economic issues in antitrust and government regulation of the U.S. economy. Econ 245 is prerequisite to Econ 246. (Academic year)
- 247 **Seminar: Industrial Organization (3)** Brock  
Selected topics in regulatory and antitrust economics. Prerequisite: Econ 101, 217, or equivalent. Offered off campus only. (Spring)
- 248 **Health Economics (3)** Bally  
Demand for medical care; organization of the health care delivery industry; policy issues on regulation, efficiency, and allocation of health care services. (Fall)
- 249 **Industrial Organization—The Telecommunication Industry (3)** Brock  
Principles of industrial organization, welfare economics, and theories of regulation, in principle and in practice. Market power, merger analysis, vertical relationships, entry, and regulation of price and lines of business. The study of market performance and business practices of the telecommunication industry. Prerequisite: Econ 217. Offered off campus only.
- 251 **Development Economics I (3)** Havrylyshyn, Smith  
The application of economic theories, empirical studies, and policy issues to economics problems of developing countries, with an emphasis on microeconomic aspects. Topics include income distribution and poverty, urban migration, peasant and agrarian efficiency, fertility preference, industrial policy, multinational enterprise, and international trade policy. (Fall and spring)
- 252 **Development Economics II (3)** Havrylyshyn, Smith  
Continuation of Econ 251, with an emphasis on macroeconomic aspects. Topics include new theories of economic growth and general theories of the development process, macroeconomic stabilization, financial repression and deepening, debt and aid policies, and applied economy-wide policy models. (Fall and spring)
- 255 **Economics of Technological Change (3)** Vonortas  
Economics of research and development; innovation and growth; the role of government in the development and use of new technology. (Spring)
- 257 **Regional Economics (3)** Yezer  
Study of regional planning and growth models, including input-output, programming, and econometric models used by planning agencies; analysis of interregional production, trade, migration, firm location, and pricing models. (Fall)

- 250 Urban Economics (3)** Yezer  
Analysis of spatial relationships among economic activities within an urban area including the urban land, labor, and housing markets; urban transportation models; fiscal relationships among jurisdictions. Prerequisite: Econ 257 or permission of instructor. (Spring)
- 263 Public Finance I (3)** Cordes, Watson  
Theoretical and empirical analysis of the economic role of the public sector and the effects of public expenditures on resource allocation and income distribution. Topics include public goods, externalities, social insurance and benefit-cost analysis. (Fall)
- 264 Public Finance II (3)** Cordes, Watson  
Theoretical and empirical analysis of the effects of taxes and transfers on the allocation of resources and income distribution. Topics include partial and general equilibrium models of tax incidence, effects of taxes on labor supply, saving, and portfolio choices of households and on investment and financing decisions of firms. (Spring)
- 267 Economies of the Former Soviet Union and Eastern Europe (3)** Pelzman, Hardt  
Analysis of current economic problems in the former Soviet Union and Eastern Europe. Topics include industrial policies and investment cycles in planned economies, trade relations between the former Soviet Union and Eastern Europe, and comparative analysis of economic policies in the former Soviet Union, Eastern Europe, and less-developed market economies. Admission by permission of instructor. (Fall)
- 268 Economies of the Former Soviet Union and Eastern Europe in Transition (3)** Pelzman, Hardt  
Analysis of the transition from centrally planned market economies in the former Soviet Union and Eastern Europe. Admission by permission of instructor. (Spring)
- 269 Economy of the People's Republic of China I (3)** Yin  
Analysis of organization, operation, policies, and problems. Development of the economy since 1949. (Fall)
- 270 Economy of the People's Republic of China II (3)** Yin  
Continuation of Econ 269, examining critical problems of development. Prerequisite: Econ 269 or permission of instructor. (Spring)
- 271 Economy of Japan (3)** Staff  
Analysis of Japanese economic institutions and their contribution to Japan's development. (Fall)
- 275 Econometrics I: Introduction (3)** Trost, Phillips  
Single-equation models of economic behavior. Statistical methods for testing economic hypotheses and estimating parameters. Topics include heteroscedasticity, serial correlation, and lagged dependent variables. Prerequisite: Econ 123. Some exposure to matrix algebra is helpful, but not required. Same as Stat 275. (Fall and spring)
- 276 Econometrics II: Simultaneous-Equation Models (3)** Trost, Phillips  
Simultaneous-equation models of economic behavior. Optional topics are maximum-likelihood estimation, limited dependent variables, and quantum-response models. Prerequisite: Econ 275. Recommended: a course in matrix algebra. Same as Stat 276. (Spring)
- 277 Laboratory in Applied Econometrics (3)** Trost  
Application of econometric theory. Use of econometric software. Each student will be required to write an empirical research paper. Prerequisite: Econ 275 or, with the permission of the instructor, Econ 123.
- 278 Economic Forecasting (3)** Joutz  
Introduction to the theoretical and applied aspects of economic forecasting. Topics include the role of forecasting, univariate time-series analysis, single equation models, multiple series models, and evaluation of forecasts. Prerequisite: Econ 275 or equivalent or permission of instructor. (Spring)
- 281 International Trade Theory (3)** Moore, Pelzman, Suranovic  
International trade theory, including alternative models of the gains from trade and evaluations of the new justifications for protectionism, and analysis of commercial policy, factor flows, and trade and investment with multinational



- corporations. Prerequisite: most sections require calculus or permission of instructor. (Fall)
- 282 **International Finance and Open-Economy Macroeconomics** (3) Dunn, Pelzman  
International finance, including alternative models of balance of payments behavior and adjustment, payments accounting, exchange markets, and alternative exchange-rate regimes. (Spring)
- 283 **Survey of International Trade Theory and Policy** (3) Dunn, Moore, Pelzman, Suranovic  
For graduate students in fields other than economics. Survey of international economics and policy; application of comparative advantage and other arguments for trade; impact of trade on a domestic economy; new arguments for protectionism; regional trading blocs. (Fall and spring)
- 284 **Survey of International Macroeconomics and Finance Theory and Policy** (3) Dunn, Moore, Pelzman, Suranovic  
For graduate students in fields other than economics. Open-economy macroeconomics; international finance; balance of payments accounting; exchange markets, alternative models of balance of payments determination and adjustment; behavior of flexible exchange rate systems. (Fall and spring)
- 285-86 **Economic Development of Latin America** (3-3) Flamm  
Econ 285: Diversity of structures of Latin American economies; import substituting industrialization; inflation; problems of underemployment and income distribution. Econ 286: Structure of trade; protection, exports, and economic development; regional and global economic integration; foreign investment, multinational enterprise, and technology transfer. (Academic year)
- 290 **Principles of Demography** (3) Boulier  
Introduction to basic demographic perspectives and data; methods for analysis of population size, distribution, and composition; determinants and consequences of population trends. Departmental prerequisite waived. Same as Geog/Soc/Stat 290. (Fall)
- 291 **Methods of Demographic Analysis** (3) Boulier  
Basic methods for analysis of mortality, natality, and migration; population estimates and projections; estimation of demographic measures from incomplete data. Departmental prerequisite waived. Same as Geog/Soc/Stat 291. (Spring)
- 295 **Special Topics** (3) Staff  
Topics vary, depending on current issues of interest and faculty availability. (Fall and spring)
- 296 **Reading and Research** (3)  
Limited to master's degree candidates.
- 299-300 **Thesis Research** (3-3)
- 305 **Seminar: Macroeconomics** (3) Bradley  
Selected topics in macroeconomics. Prerequisite: Econ 205.
- 310 **Economic Methodology** (3) Goldfarb, Stewart  
Methodology of economics, review of selected theoretical issues in economic theory. Prerequisite: six credit hours of graduate courses in economic theory.
- 312 **Seminar: Price Theory** (3) Staff  
Selected topics in price theory.
- 315 **Seminar: Topics in Mathematical Economics** (3) H. Solomon, Fon, Ye  
Intensive study of selected topics, including economic activity analysis, risk and uncertainty, and other topics of current interest. Prerequisite: Econ 215-16.
- 321 **Seminar: Monetary Theory** (3) Aschheim, Bradley  
Recent developments in monetary theory.
- 341 **Seminar: Labor Economics** (3) Goldfarb  
Current problems in theory and policy.
- 345 **Seminar: Industrial Organization** (3) Kwoka  
Review of recent literature and current policy issues. Admission by permission of instructor.
- 346 **Topics in Health Economics** (3) Staff  
Advanced topics in health economics. Prerequisite: Econ 248 or permission of instructor.

- 351 **Seminar: Economic Development (3)** Havrylyshyn, Smith  
Analysis and review of recent theoretical work and/or selected topics of current policy interest. Prerequisite: Econ 251 and 252 or permission of instructor.
- 363 **Seminar: Public Finance (3)** Cordes, Watson  
Selected topics of current interest.
- 367 **Seminar: Topics in the Study of Formerly Centrally Planned Economies (3)** Pelzman  
Advanced analysis of the transition to markets in formerly centrally planned economies. Prerequisite: 267 and 268, or permission of instructor.
- 390 **Seminar: International Economic Theory (3)** Dunn, Pelzman  
Primarily for doctoral students. Examination of recent contributions in this field.
- 391 **Seminar: International Economic Policy (3)** Staff  
Topics selected from current significant policy problems.
- 397 **Dissertation Proposal Seminar (3)** Staff  
Limited to Doctor of Philosophy candidates in Unit II. Critical analysis of current research. Formulation of a dissertation proposal and development of dissertation research strategies.
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## EDUCATIONAL LEADERSHIP

Professors M.N. Rashid, J.G. Boswell, D.A. Moore, S.R. Paratore (Chair), R. Ferrante, J.A. Greenberg, J.D. Fife, D.H. Holmes, M. Worth, B. Wolfman, H. Pitt (Visiting), L.E. Powell (Visiting), P.P. Smith

Adjunct Professors R.C. Rist, C. Gerhard, D. Iwamoto, H. Torabi

Associate Professors W.F. Lynch, J. McDonald, H.I. Willett

Assistant Professor C.B. Stapp

Adjunct Assistant Professor D. Niles

Adjunct Instructor J. Landau

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Master of Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education.

Departmental prerequisite: A bachelor's degree from an accredited college or university is prerequisite to all 200-level courses. With permission of the instructor, undergraduates in their senior year may enroll in 200-level courses.

- 201-2 **International Education (3-3)** Moore  
A study of a selected sample of foreign education systems as they reflect culture, history, values, people, and current changes. Research techniques to develop a global frame of reference. International resources and resources unique to the Washington area are utilized. (Summer)
- 203-4 **Comparative Education (3-3)** Moore and Staff  
A systematic investigation of the educational structure and practices of selected representative school systems throughout the world. Emphasis on development of a methodology for comparative study. (Academic year)
- 205 **International Experiences (1 to 6)** Staff  
Travel to a foreign country for specific study and research. Admission by permission of the instructor.
- 206 **American Education: Introduction and Overview for International Students (3)** Moore  
The nature and organization of American education in a social, historical, and philosophical context; understanding contemporary change and how it is reflected in the education system.
- 207 **Instructional Materials, Media, and Resources (3 to 6)** Staff  
Review of technological contributions to education. Examination of current and emerging developments. Framework for study of selection, utilization, integration, and evaluation of audiovisual media in the teaching/learning process.



- 208 Human Development (3)** Rashid  
Consideration of human development and behavior throughout the life span; emphasis on practical implications of relevant interdisciplinary research. (Spring and summer)
- 209 Child Development (3)** Rashid  
Interdisciplinary approach to child development and behavior. Practical implications of research in disciplines contributing to knowledge about childhood. (Fall)
- 210 Adolescent Development (3)** Rashid  
Interdisciplinary approach to adolescent development and behavior. Practical implications of research in disciplines contributing to knowledge about adolescence. (Spring)
- 212 Quantitative Methods I: Introduction to Survey Measurement and Research (3)** Staff  
Introduction to measurement techniques and evaluation. Emphasis on application and interpretation of data-gathering techniques and descriptive statistics. (Fall, spring, and summer)
- 213-14 Western Educational Thought (3-3)** Boswell  
Following the themes of certainty, equality, and progress, this course examines the ideas of selected philosophers in their historical context and relates them to education. Educ 213: From Sumer to the Enlightenment; Educ 214: From the Enlightenment to the present with concentration on the American experience. (Fall and spring)
- 216 Advanced Study of the History of Education (3)** Boswell  
Individually planned program of study on topic of student's interest. Prerequisite: Educ 213-14 or the equivalent.
- 217 Advanced Study of the Philosophy of Education (3)** Boswell  
Individually planned program of study on topic of student's interest. Prerequisite: Educ 213-14 or the equivalent.
- 218 Social Foundations of Education (3)** Boswell  
The relationship between school and society; social, economic, and political purposes of schooling as well as forces that shape policies and school curricula. Contemporary issues and their implications for the future.
- 220 Experimental Course (arr.)** Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 222 Museum Studies (3)** Stapp  
An overview of the museum as an environment for learning, considering the influence of institutional history and organizational structure on the museum's mission of serving the public. Admission by permission of instructor. (Summer)
- 223 Museum Audiences (3)** Staff  
A survey of the museum's diverse audience, emphasizing implications for effective programming, with attention to audience research. Admission by permission of instructor. (Fall)
- 224 Communication Skills (3)** Staff  
Theory of and practice in the development of communication skills in the museum. Educational concepts; teaching strategies and techniques; institutional liaison and group process. Admission by permission of the instructor. (Summer)
- 226 Internship and Seminar in Museum Education (6)** Stapp  
Four-day-a-week placement in education departments in area museums supervised by George Washington University faculty. On-campus seminar includes grant proposal writing. Admission by permission of instructor. (Spring)
- 227 Museum Evaluation (3)** Stapp  
Evaluation and research methods appropriate to the museum setting. Review of research on museum audiences; designing program and exhibit evaluations. Admission by permission of instructor. (Summer)
- 228 Selected Topics in International Education (3)** Moore  
Investigation of historical development of international education; research on selected topics of general importance to the field of international education. Admission by permission of instructor. (Fall)

- 229 **Cross-Cultural Studies of Human Development (3)** Rashid  
Theories of life-span development and of culture are the basis for the cross-cultural study of selected topics in human development. (Fall)
- 230 **Managing Computer Applications (3)** Ferrante  
For managers and prospective managers in education and human services who are concerned with the automation of their operations. Basic principles needed to design, implement, and manage an information system. Prerequisite: permission of instructor. (Spring and summer)
- 231 **Educational Hardware Systems (3)** Lynch  
Design and implementation of education hardware systems, including computers, videodisks, networks, film technology, video systems, and ITV.
- 232 **Applying Educational Media and Technology (3)** Lynch  
Theory and practice of educational technology. Key characteristics of different media principles of application, and issues concerning their appropriate use.
- 233 **Supervised Experience in Education and Human Development Services (3 to 6)** Staff  
Admission by permission of instructor. (Fall and spring)
- 234 **Computers in Education and Human Development (3)** Staff  
The research and practice surrounding the use of computers in educational and training settings. Students will acquire the practical knowledge necessary to the development and evaluation of computer-related curricula through the study of current software applications and programming environments.
- 235 **Design and Implementation of Educational Software (3)** Staff  
Theory and practice of creating educational software; psychological basis of using software in learning; instructional programs; authoring tools; artificial intelligence applications; interactive media. Students are required to design, program, and evaluate an educational program.
- 240 **Proposal Writing (3)** Ferrante  
The preparation of proposals for educational, business, and industrial applications, including those submitted for funding. Many styles and formats are illustrated. Each student will prepare a proposal in cooperation with an organization or agency. (Fall and summer)
- 242 **Fundamentals of Educational Administration (3)** McDonald  
Organization, structure, and governance of public education; federal, state, and local responsibilities. Basic administrative leadership theory. Roles and functions of school administrators
- 243 **Human Relations in Educational Management (3)** McDonald  
Principles and practices in human relations for teachers, administrators, other school personnel, parents, and community leaders. Current theoretical and research findings; applications to social change, techniques of working with individuals and groups.
- 244 **Managing Multicultural Environments (3)** McDonald  
Management issues, curricula, and practices affecting multicultural environments.
- 246 **Administrative Issues in Education (3)** McDonald  
Administrative strategies and practices appropriate to problems in education.
- 248 **Supervision and Evaluation of Instruction (3)** Staff  
Study of interdisciplinary foundations of supervision. Special attention to the function of theory, change, individual and group relationships in organizations, staff influence processes, talent utilization, and evaluation of programs and staff. (Summer)
- 250 **Educating Language Minorities (3)** Staff  
A study of federal, state, and local policies and issues affecting the education of linguistically diverse populations. Resources for use with specific linguistically diverse groups. (Spring)
- 251 **Linguistic Applications in English as a Second Language (3)** Staff  
A study of the science of language and how its different branches (descriptive, social, applied, etc.) may be used for ESL teacher training, classroom instruction, material development, evaluation, research, and policy development. (Fall)



- 252 **The English Sound System in English as a Second Language** (3) Staff  
A description of the phonological composition and variation of English as applied to instructional practices specifically oriented toward linguistically diverse groups. (Fall)
- 253 **The Structure of English in ESL Practice** (3) Staff  
A review of the morphological and syntactic characteristics of English, as related to instructional practices specifically oriented toward linguistically diverse groups. (Spring)
- 254 **Issues, Studies, and Practices in English as a Second Language** (3) Staff  
A critical review of scholarship and research findings in English as a second language. Major policy issues and implications that relate to ESL practice. (Summer)
- 259 **The Principalship, K-12** (3) Powell  
A general introduction to the principalship. Administrative tasks and procedures are stressed, together with the principal's role in handling educational issues and problems.
- 260 **Supervision in the Elementary and Secondary School** (3) Staff  
For experienced teachers and administrators. Review of modern supervisory concepts, including practices in schools. Prerequisite: Educ 248. (Spring)
- 261 **Practicum in Human Development** (3) Rashid  
Open to human development majors with permission of instructor.
- 262 **Internship in Human Development** (3) Rashid  
Open to human development majors with permission of instructor.
- 267 **Practicum in College Student Development** (3 to 6) Staff  
Supervised practical experience in college student development programs. Admission by permission of instructor. (Fall and spring)
- 268 **Power, Leadership, and Education** (3) Boswell  
The nature of power, leadership, and education; the relationship of power to leadership; the essential nature of education in the exercise of power and leadership in a democratic setting. (Fall)
- 271 **Policy-Making for Public Education** (3) Boswell, Ferrante  
The nature of educational policy; the role of single-interest groups, the courts, legislative bodies, administrative bureaucracies, and professionals in establishing parameters and allocating resources. Analysis of specific techniques of policy formation. (Summer)
- 272 **Educational Planning** (3) Staff  
An examination of the planning movement in education: its historical development and the recent shift in premises, context, and expectations. Different approaches to the planning process; its relationship to the concepts of systems and futurism; participatory, sectorial, and regional aspects; role of research, and overview of main analytical techniques currently in use. (Fall)
- 273 **Foundations of College Student Development** (3) Staff  
College student development theories, practices, and problems, including historical overview and human development theories related to college students. (Fall)
- 274 **Group and Organizational Theories** (3) Staff  
Focus on theorists, including Argyris, Blau, Miles, Festinger, and Lewin, and practical application of theories to various organizational settings and individuals. Prerequisite: permission of instructor. Same as HRD 274. (Spring)
- 275 **School Finance** (3) McDonald  
Issues in financial support of public education. Local, state, and federal roles. Revenue sources and distribution.
- 276 **School-Community Relations** (3) McDonald  
The function, purposes, and resources of school public relations. Development of skills in planning public relations programs and activities. Theory and practice of effective communication.
- 277 **Dynamics of Change** (3) Boswell  
An analysis of the process of change, particularly as it relates to educational policy. Comparison of theories; analytical tools; historical precedents; examples of federal educational policies.

- 278 **School Law (3)** McDonald  
Constitutional and statutory provisions for public school education; origin and legal status of the local school unit, nature of the school board; legal status of teachers and administrators; legal rights and responsibilities of parents and students. (Spring)
- 279 **Practicum in Supervision (3 to 6)** McDonald and Staff  
Practical experience in supervision of instruction. Admission by permission of instructor. (Fall and spring)
- 280 **Internship in Supervision and Instructional Leadership (3 to 6)** McDonald and Staff  
Service in a school situation directed by the University's faculty and school systems; integration of theory and practice. (Fall and spring)
- 281 **Program Evaluation: Theory and Practice (3)** Holmes  
A general introduction to the theory of evaluation of social programs. Overview of evaluation models, methodology associated with program evaluation, and examination of evaluation in the context of political and social environments. (Fall)
- 282 **Administration of College Student Development Services and Programs (3)** Staff  
An overview of student affairs administrative practices, including needs assessment, planning models, budgeting, policy development, program development, facility management, evaluation, and team building. Admission by permission of instructor. (Fall)
- 283 **Higher Education in the United States (3)** Greenberg and Staff  
History, scope, purpose, present status, programs, and trends in higher education in the United States. (Fall and spring)
- 284 **Administration of Higher Education (3)** Ferrante, Fife, and Staff  
Government, organization, and administration of colleges and universities; duties of trustees and administrators. (Fall and spring)
- 285 **Education and National Development (3)** Boswell  
Examination of the basic assumption that education contributes to national development. In addition to economic growth and civic identity, what constitutes national development in advanced industrial societies and societies moving to industrialism? What role does education play in promoting this process? (Fall)
- 286 **Interpretation in the Historic House Museum (3)** Stapp  
Same as AmCv 286. Seminar integrating advanced practices of museum education with current scholarship in architectural history, material culture, social history, and women's studies. Extensive use of Washington museum resources. Open to undergraduate and graduate students. (Fall)
- 292 **Practicum in Program Evaluation (3 to 6)** Holmes  
Supervised practical experience in field placements. Admission by permission of instructor. (Fall and spring)
- 293-94 **Research and Independent Study (1 to 3)** Staff  
Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)
- 295 **Quantitative Methods II: Research Procedures (3)** Paratore, Holmes  
Required of all candidates for master's degrees in education. Analysis of scientific approaches to problems in education; evaluation of research techniques. Prerequisite: Educ 112, 212; or equivalent. (Fall and spring)
- 299-300 **Thesis Research (3-3)** Staff
- 301 **Advanced Study: Ideas, Issues, and Practices in Education (3)** Boswell  
For precandidates for the Ed D. Alternative means of responding to the complexities of the educational process. Topics vary but concern education as an individual process and as sociocultural preservation and renewal.
- 302 **Quantitative Methods III: Inferential Techniques (3)** Holmes, Paratore  
Educ 302 or Stat 105 is required of all doctoral students in education. Prerequisite: Educ 212 or a basic statistics course and permission of instructor. (Fall and spring)



- 303 **Data Analysis (3 to 6)** Staff  
Use of computer in data analysis. For doctoral students at the dissertation-planning stage. (Fall and spring)
- 306 **Quantitative Methods IV: Advanced Research Design (3)** Holmes, Paratore  
Required of all doctoral students in education. Evaluation and application of educational research designs. Prerequisite: Educ 302 or equivalent. (Fall and spring)
- 307 **Qualitative Research Methods (3)** Holmes and Staff  
A general introduction to qualitative research procedures in social science research. Application of qualitative methods, design, analysis. (Fall)
- 329 **Seminar in Program Evaluation (3)** Holmes  
Contemporary problems and issues in evaluation of social programs: design, implementation, analysis, and utilization. (Spring)
- 330 **Educational Facilities Planning (3)** McDonald  
Principles of school plant planning; site selection; evaluation of existing buildings; adaptation to curricular needs; building operation and maintenance; disposition of surplus facilities; energy and accessibility considerations.
- 331 **Personnel Administration (3)** McDonald  
Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions; current issues.
- 334 **Doctoral Internship in Educational Policy (3 to 6)** Holmes  
Supervised internship in education or human services settings for advanced doctoral students.
- 340 **Methods of Policy Analysis in Education (3)** Holmes and Staff  
Modes of analysis employed in the study of educational policy issues. Alternative methods of analysis for policy formation, implementation, and impact assessment. Both theoretical and case study materials are used. Prerequisite: Educ 295. (Fall and spring)
- 341 **Cognitive Models and Instruction (3)** Rashid  
Cognitive models (Guilford, Bruner, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through adulthood. (Fall)
- 342 **Language Development (3)** Rashid  
Nature of language acquisition and development; emphasis on sociolinguistics and psycholinguistics most pertinent to education. (Spring)
- 343 **Advanced Studies in Human Development (3)** Rashid  
Review and consideration of empirical research studies on selected topics in human development. Issues, instrumentation, and research needs in respect to each topic discussed. Admission by permission of instructor. (Spring)
- 344 **Adult Development and Aging (3)** Rashid  
Theories and research on personality and cognition in adulthood and old age. Emphasis on evaluating research designs and methods and deriving implications of findings for gerontological programs and selected professional roles. (Spring)
- 345 **Advanced Studies in Educational Policy Analysis (arr.)** Holmes
- 352 **Seminar: Western Educational Thought (arr.)** Boswell
- 353 **Seminar: Higher Education Administration (arr.)** Greenberg, Ferrante
- 354 **Seminar: Administration and Supervision (arr.)** McDonald and Staff
- 355 **Seminar: Applied Educational Administration (3 to 6)** Staff  
Application of the theories and principles of administration to public and private schools. Field experience in a phase of administration and supervision. Admission by permission of instructor. (Fall and spring)
- 356 **Seminar: Human Development (arr.)** Rashid
- 369 **School Business Management (3)** Pitt  
Philosophy, responsibilities, and functions of school business management, including site-based budgeting, with a system-wide perspective.
- 372 **Internship in Higher Education (3 to 6)** Greenberg and Staff  
Supervised experiences in selected areas in college teaching. Admission by permission of instructor. (Spring)

- 373 **The Community/Junior College (3)** Greenberg  
The two-year college as it relates to secondary education, four-year colleges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges. (Fall and spring)
- 374 **Current Issues in Higher Education (3)** Ferrante  
Prerequisite: Educ 283, 284. (Spring)
- 378 **Financing Higher Education (3)** Staff  
Analysis of private, state, and federal revenue sources; student aid, program budgets, and financial methods and practices. (Spring)
- 379 **Administration and Governance of Two-Year Colleges (3)** Greenberg, Ferrante  
A study of the community/junior college, focusing on administrative patterns and national, regional, state, and local influences, as well as the theory and structure of two-year college organization. (Fall and spring)
- 380 **Legal Problems in Higher Education (3)** Fife  
Investigation of legal problems in higher education related to the legal structure of higher education, religious concerns, students, faculty, and academic programs. (Spring)
- 381 **College and University Curriculum (3)** Fife  
Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum. (Fall)
- 382 **Teaching Strategies for Adult Learners (3)** Greenberg  
Designing, implementing, and evaluating instructional strategies for adult learners. Assessing needs, writing objectives, selecting curriculum content, selecting and implementing methods and techniques, selecting appropriate mediating devices, and evaluating instruction. (Spring)
- 384 **College and University Governance (3)** Ferrante  
Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284. (Fall)
- 385 **Problems and Practices in Educational Administrative Organization (3 to 6)** Ferrante, Fife, Greenberg  
Application of principles and practices concerned with change and evaluation of educational administration.
- 386 **Internship: Higher Education Administration (3 to 6)** Greenberg  
Service in a higher education situation directed by the University and the cooperating institution to integrate theory and practice. (Fall and spring)
- 387 **Internship: Administration (3 to 6)** McDonald and Staff  
Service in an educational institution or education-related program directed by the University's faculty. (Fall and spring)
- 388 **Case Studies in Higher Education Administration (3)** Ferrante  
An analysis of case studies related to administrative functions in colleges and universities.
- 390 **Pre-Dissertation Seminar (3 to 6)** Staff  
Required of all Ed.D. degree candidates. Approval of the dissertation research design is necessary for successful completion of the seminar. Admission by permission of instructor.
- 391 **Dissertation Research (arr.)** Staff  
Prerequisite: Educ 390.

## ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

Professors W.K. Kahn, R.L. Pickholtz, M.F. Eisenberg, A.C. Meltzer, W.D. Maurer, A.D. Friedman, H.J. Helgert, R.H. Lang, N. Kyriakopoulos, T.N. Lee, E. Della Torre, R.J. Harrington (Chair), L.J. Hoffman, O.N. Garcia, W. Wasylkiwskyj, N.A. Alexandridis, S.Y. Berkovich, M.B. Feldman, M.H. Loew, G.V. Borgiotti, R.L. Carroll, Jr., M.E. Zaghloul, M. Pardavi-Horvath, B.I. Edelson (Research), P.S. Bock, G. Frieder

Adjunct Professors J.M. Aein, P.J. Crepeau, G.J. Kowalski, D.C. Roberts, A. Schneider, C. Alexander, Jr., W.D. Jackson, H.-L.A. Hung, J.R. Silverman

Professorial Lecturers A.A. Wolf, W.T. Bisignani, R.K. Khatri, C.E. Dunham, L.M. Leibowitz, P.M. Kelly, M. Mohajeri, F. Dellon, J.A. Knight, J.H. Scharen-Guivel, M.H. Friedman, T.T. Nreh, G.M. Borsuk, J. Donelson III, J.W. Benoit, R.A. Herring, Jr., A.F. Manfredi, Jr., A.K. Mehrotra, C.-H.C. Wang, W.W. Wu, R.M. Finn, D.L. Nicholson, W.L. Pritchard, J.M. Schumpert, M.S. Gluck, D.R. Smith, A.T. Le



Adjunct Associate Professor O.S. Mazzoni

Associate Professors D.C. Rohlfs (Director of Laboratories), J.L. Sibert, Z. Kitov (Research), S. Rotenstreich, R.S. Heller, C.D. Martin, D. Saha, H.-A. Choi, K.B. Eom

Associate Professorial Lecturers M.C. Chen, R.D. Angelari, J.C.-C. Hsing, G.R. Lawrence, J.W. Fussell, P.A. Lamb, C.V. Stewart, A.L. Breitler, P.K. Wahi, C.A. Eldridge, J.A. Lipkin, Y.-S. Fu, C.M. Waspy, J. Epstein, L.A. Fletcher, J.S. Davies, Jr., E.B. Leiderman, E.H. Neal, J.J. Seppy, L.L. Burge, J.E. Pfandtner, C.E. Knadler, Jr., E.A. Walker, J.F. Kuehls, T.B. Fowler

Assistant Professors A.K. Kakaes, B. Narahari, H. Senay, A. Youssef, J.K. Hahn, M. Azizoglu, B.R. Vojcic, D. Gobovic (Visiting), C.E. Korman

Assistant Professorial Lecturers T.R. Husson, K.J. Schmucker, J.B. Bronder, S.J. Koch, J.D. Kotulski, R.M. Tarakan, E.A. Walker, T. Nelson, R.M. Holland, J.W. Sargent, M.F. D'Antonio, M.C. McElvaney, Y.K. Park, E.S. Armstrong, D.D. Moerder

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

**Note:** Doctoral students must select a minimum of three of the courses designated with an asterisk as part of the program in the major area.

## ELECTRICAL ENGINEERING

- 201 Signals and Transforms (3)** Wasyliwskyj and Staff  
Signals in electrical circuits. Representation of signals in time and frequency domains. Fourier transforms in electrical network analysis. Applications of complex variable theory to electrical circuits and waveforms. Transform theory as applied to parts of network functions. Laplace transforms applied to continuous systems. Discrete time signals and z-transforms. (Fall and spring)
- 202 Linear Systems Theory (3)** Kyriakopoulos and Staff  
Introduction to linear systems theory. Topics include linear vector spaces and linear operators, mathematical representation of dynamic linear systems, concept of state and solution of the state equation, controllability and observability, canonical forms of the state equation, state feedback, and state estimation. (Fall and spring)
- 203 Graph Theory and Applications (3)** Kakaes and Staff  
Undirected and directed graphs. Connectivity, partitions, cycles and matchings. Edge and vertex coloring, chromatic polynomials, and the four-coloring problem. Planar graphs and Kuratowski's theorem. Properties of random graphs. Applications to a variety of problems. (Spring)
- 204 Stochastic Signals and Noise (3)** Saha and Staff  
Basic concepts of probability; random variables: discrete and continuous, transformation and applications, sequence of random variables, characteristic function, central limit theorem, LMS estimation; random process: stationarity, Gaussian process, correlation, power spectrum, LMS estimation, linear filtering. Prerequisite: ApSc 115 or equivalent. (Fall and spring)
- 205 Random Processes in Engineering (3)** Saha and Staff  
Markov process, Kolmogorov equation. Birth-death process, queuing model for networks. Wiener process, martingales, diffusion processes. Estimation of power spectra. Discrete time Kalman filtering. Stochastic difference and differential equations. Applications to communications, control, propagation, random media and computer science. Prerequisite: EE 204 or equivalent. (Spring)
- 206 Electromagnetic Theory I (3)** Lang and Staff  
Electrostatic fields, multipoles, dielectric media, boundary conditions, uniqueness theorem. Solution of electrostatic problems: separation of variables and Green's function techniques. Energy relations and forces. Steady-state currents, magnetic fields, vector and scalar magnetic potentials. Prerequisite: EE 32 or equivalent; concurrent registration: EE 201. (Fall)
- 207 Electromagnetic Theory II (3)** Lang and Staff  
Maxwell's equations, moving media, vector wave equations. Poynting vector theorem, time-harmonic solutions. Plane waves in isotropic and anisotropic media, polarization, phase and group velocity. Reflection and refraction of plane waves at interfaces. Radiation, dyadic Green's functions and aperture diffraction. Prerequisite or concurrent registration: EE 201. (Spring)

- 208 Digital Image Processing (3)** Loew and Staff  
Properties of images and visual systems. Image acquisition, sampling, quantization. One- and two-dimensional image transform techniques: enhancement and restoration. Image coding and data compression. Segmentation, representation, boundary and shape, texture, matching. Image understanding. Computer applications and projects. Prerequisite: EE 204. (Spring)
- 212 Network Analysis (3)** Zaghloul and Staff  
Network theorems, functions, and properties. Introduction to the theory of nonlinear networks, nonlinear resistive network equation formulation, hybrid and other nonlinear equations. Nonlinear dynamic network equation formulation, state space, conditions for existence. Concepts of stability in nonlinear networks, conservative and Lagrangian networks and systems. (Fall, odd years)
- \*213 Design of VLSI Circuits (3)** Zaghloul and Staff  
Characteristics of digital electronic design, design environment, algorithm level, simulation techniques. Logic level, switch level, timing verification. Geometric design rule, checker node extraction, output design aids. Prerequisite: EE 126 or permission of instructor. (Spring, odd years)
- 214 VLSI Design (3)** Zaghloul and Staff  
Advanced design and analysis techniques for VLSI circuits. Design of reliable VLSI circuits, noise consideration, semi-custom design gateways. Techniques for data-path and data-control design. Simulation techniques. Students design VLSI system using CAD computer and simulate design. Prerequisite: EE 126 or permission of instructor. (Fall, odd years)
- 215 Linear Network Synthesis I (3)** Lee and Staff  
Properties and testing of positive real functions. Synthesis of LC, RL, and RC one-port networks. Brune, Bott-Duffin, Miyata, Kuh, and Darlington synthesis techniques. Introduction to two-port ladder and lattice synthesis. Three-terminal RC network synthesis approximation in the frequency and time domains. Prerequisite: EE 202 or permission of course director. (Fall, even years)
- \*216 Active and Distributed Networks (3)** Lee and Staff  
Active network synthesis using negative resistors, control sources, NIC, operator, and operational amplifiers. Uniform and nonuniform distributed network analysis and synthesis—computer-aided design. Prerequisite: EE 215. (Spring, odd years)
- 217 Neural Networks (3)** Zaghloul and Staff  
Theory of neural network models, relation to biological models. Examples of known models. Possible applications of neural networks. Neural network VLSI implementations, digital vs. analog approaches. Building blocks. Examples on realized neural networks. (Spring, even years)
- 218 Analog VLSI Circuit Design (3)** Zaghloul and Staff  
MOS technology: building blocks, devices, capacitors, limitations. Operational amplifiers and other analog systems. Layout examples and design principles. Students use the CAD VLSI laboratory to design and simulate circuits. Prerequisite: EE 126 or equivalent. (Fall, even years)
- 221 Physical Electronics I (3)** Pardavi-Horvath and Staff  
Theoretical principles underlying the operation of electronic devices. Foundations of quantum mechanics: Langrangian and Hamiltonian. Quantum mechanics. Particle-wave duality. Wave mechanics and matrix mechanics. Quantum theory of electrons. (Fall)
- 222 Physical Electronics II (3)** Pardavi-Horvath and Staff  
The Boltzmann transport equation. Particle statistics (Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac distribution). Electrons in a crystal: band theory of semiconductors. Physical principles of semiconducting devices (junctions, surfaces, contacts, transistors, Gunn-diodes) and lasers. Prerequisite: EE 221. (Spring)
- 223 Optical Communications Systems (3)** Kahn and Staff  
Optical communications channels: survey of laser sources; modulation; line-of-sight links; system models and analysis; detection, noise mechanisms, and signal-to-noise analysis; optical-fiber waveguides, repeaters, and systems analysis; integrated optical components. Prerequisite: EE 207, 243. (Spring, odd years)



- \*224 Electronics of Lasers (3)** Kahn and Staff  
Basic concepts from quantum mechanics, Einstein coefficients, inversion and pumping mechanisms, rate equations. Resonators, He-Ne laser; organic dye lasers, injection lasers. Nonlinear interactions in lasers. Prerequisite: EE 222 or equivalent. (Fall, every third year)
- 225 Nonlinear Electronics (3)** Korman and Staff  
Analysis and design of electronic components and systems operating as switching, sweeping, gating, and pulse generators. Study of multivibrators, negative resistance devices and amplifiers, nonlinear operation of oscillators. Prerequisite: EE 201 or equivalent. (Fall, even years)
- \*226 Fiber and Integrated Optics (3)** Kahn and Staff  
Propagation in stepped-index and gradient-index optical fibers: scattering and attenuation, phase velocity, group velocity, impulse response, energy transport, ray tracing, Goos-Haenchen shift, Hamiltonian formalism. Directional couplers, modulators, and deflectors in fibers and surface films. Coupled-mode theory. Prerequisite: EE 133. (Spring, even years)
- 227 Industrial Electronics (3)** Heller and Staff  
Applications of electronic devices in industry, continuous and sampled control systems, induction and dielectric heating, timing and counting circuits, reliability and automatic checking equipment, digital control of machine tools. Prerequisite: EE 201 or equivalent and graduate status. (Fall, odd years)
- 228 High-Frequency Electronics (3)** Heller and Staff  
Design and analysis of the operation of electron-tube, solid-state, crossed-field, space-charge wave, and quantum maser oscillators and amplifying devices that lay the foundation of modern communications systems. Prerequisite: EE 207 or equivalent. (Spring, even years)
- 230 Design of Memory Devices (3)** Della Torre and Staff  
Physical principles of magnetic and semiconductor memory devices. Design and manufacture of Ram's and disk files. Device and system characteristics reliability. Prerequisite: EE 122. (Spring, odd years)
- 232 Electrodynamics (3)** Wasylkiwskyj and Staff  
Special theory of relativity. Transformation and covariance of electrodynamics. Relativistic particles in external fields. Magnetohydrodynamics. Plasmas, pinch effect, instabilities. Radiation from accelerated particles. Prerequisites: EE 207. (Spring, every third year)
- 233 Microwaves and Components (3)** Kahn and Staff  
High-frequency transmission lines and guided systems, matching techniques, scattering parameters, transfer parameters, directional couplers, cavity resonators, Faraday rotation, ferrite isolators and circulators. Prerequisite: EE 133. (Fall)
- 234 Wave Propagation (3)** Wasylkiwskyj and Staff  
Electromagnetic and acoustic propagation in inhomogeneous media. WKB approximation, geometrical optics, layered media. Stationary phase and steepest descent evaluation of integrals; application to field computation at caustics. Prerequisite: EE 207. (Spring, even years)
- 235 Antennas (3)** Kahn and Staff  
General solution of Maxwell's equations in terms of current sources, polarization, far-field approximations, radiation from current distributions, field equivalence theorems, geometrical optics approximation, aperture antennas, receiving antennas, theory of arrays, and applications to specific antennas and antenna types. Prerequisite: EE 133. (Spring, odd years)
- 236 Electromagnetic Radiation and Scattering (3)** Wasylkiwskyj and Staff  
Electromagnetic scattering by simple shapes, asymptotic high-frequency approximations, creeping waves, geometrical theory of diffraction. Approximation techniques in radiation and scattering: Rayleigh and Born approximations. Prerequisite: EE 201, 207. (Fall, odd years)
- \*237 Waves in Random Media (3)** Lang and Staff  
Propagation and scattering of electromagnetic, optical, and acoustic waves in random media, scattering from rough surfaces and randomly distributed particles, turbulence. Applications to propagation through rain and fog. Laser beam scintillations, remote sensing, and communications channel modeling. Monte Carlo simulation. Prerequisite: EE 204, 207. (Fall, even years)

- 238 Remote Sensing (3)** Lang and Staff  
Active and passive remote-sensing systems: scatterometers, real-aperture imaging, and synthetic-aperture radars. Sensing of surface, subsurface, and atmospheric parameters at microwave, infrared, and optical frequencies. Analysis of radiometric techniques using radiative transport theory, inverse scattering methods, profile inversion. Prerequisite: EE 133. (Spring, odd years)
- 239 Numerical Electromagnetics (3)** Della Torre and Staff  
Numerical methods for the solution of electromagnetic problems dealing with scattering by complex shapes, antenna design, transmission through anisotropic and dispersive media, electrodynamic interactions with charged particles. Convergence experiments dealing with moment methods, hybrid GTD, variational computations. Prerequisite: CSci 100, EE 155, 207. (Spring, even years)
- 241 Information Theory (3)** Saha and Staff  
The concepts of source and channel. Measure of information, entropy, mutual information. The noiseless coding theorem. The noisy coding theorem. Channel capacity: symmetric and nonsymmetric channels. Gaussian and binary symmetric channels. Rate-distortion theory. Basics of multiple-user information theory. Prerequisite: EE 204. (Fall)
- 242 Coding Theory (3)** Pickholtz and Staff  
Linear codes: parity and generator matrices, syndrome error correction and deletion capability, minimum distance. Performance bounds of linear codes, Hamming and Golay codes. Galois fields, shift-register implementation. Cyclic codes. BCH codes: the BCH decoding algorithm, burst-correction codes. Applications to computers, communications, and recording. Prerequisite: EE 204. (Spring)
- 243 Communication Theory I (3)** Pickholtz and Staff  
Optimum receivers for vector channels and for the additive white Gaussian noise channel; correlation detectors, matched filters; coherent and noncoherent detection; bounds on the performance of communications, comparison of communications systems. Prerequisite: EE 204 or equivalent. (Fall and spring)
- 244 Communication Theory II (3)** Pickholtz and Staff  
Schemes for efficient signaling for data sequences; effects of quantizing at the receiver. Practical implementation of orthogonal and simplex coded communication. Convolutional codes. Trellis codes: bounds on performance decoding by sequential (Zigangirov-Jelinek, Fano) and MAP (Viterbi) algorithms. Topics from digital communications. Prerequisite: EE 243. (Spring)
- 245 Signal Detection and Estimation (3)** Wasyliwskyj and Staff  
Estimation of spectra of discrete and continuous time stationary processes. Autoregressive, ARMA, and maximum entropy spectrum estimation; CAT and AIC criteria. Prerequisite: EE 204. (Fall)
- 246 Digital Communications (3)** Pickholtz and Staff  
Analysis and design of digital communications systems for voice, video, and data. Digital coding of waveforms: Nyquist criteria, intersymbol interference (ISI). Partial response signaling. Practical considerations in design of modems. Digital switching and integrated services digital networks. Prerequisite: EE 244. (Fall)
- 247 Communications Systems (3)** Saha and Staff  
Digital communications systems. Generation of carrier phase references using phase-locked loops (PLL). Optimum design of PLL. Maximum-likelihood estimation of carrier phase and symbol timing. Performance degradation. Applications to PCM, TDMA, and spread-spectrum systems. Prerequisite: EE 244 or equivalent. (Spring)
- 248 Computer Networks I (3)** Helgert and Staff  
Local and wide area switched networks. Topologies, architectures, the OSI Reference Model. Data transmission techniques, synchronous and asynchronous communications, baseband signaling modems. FDIX and TDM. Error-control, data link control, flow control, bisync and HDLC procedures. Network protocols. Prerequisite: EE 144 or equivalent. (Fall and spring)
- 249 Computer Networks II (3)** Helgert and Staff  
Design and analysis of computer communication networks. Circuit and packet switching. Traffic theory for data. Queuing models. Buffer design and statistical multiplexing. Delay and cost minimization, topological design algorithms. Net-



- work routing and flow control. Analysis of multiple-access algorithms. Prerequisite: EE 204, 248. (Spring)
- \*250 **Telecommunications Security** (3) Azizoglu and Staff  
Cryptography. Speech and data scrambling. Nonlinear transformations. Block and stream ciphers. DES algorithm and public key cryptography. Key management, digital signatures, and authentication. Data communication security protocols. Secure voice communications. Companion course to CSci 229. Prerequisite: EE 204. (Spring, odd years)
- 251 **Telecommunication Networks** (3) Kakaes and Staff  
Switching technology and traffic models for circuit, packet, and integrated networks. CCIS and SS7. Analytical bounds on the complexity of switched networks. Digital time-division and store-and-forward switches. Mobile switching office and cellular networks. PEABX and distributed switching. Prerequisite: permission of course director. (Spring, even years)
- 252 **Digital Signal Processing Techniques** (3) Kyriakopoulos and Staff  
Signal and system representation, sampling and quantization, transform techniques. Recursive and nonrecursive digital filter design, recursive estimation, linear predictive filtering. Fast algorithms for signal processing. Current topics. Prerequisite: EE 117 or 201, and 204. (Fall)
- 254 **Radar Systems** (3) Borgiotti and Staff  
The radar range equation. Radar cross section of targets, target detection and parameter estimation, detection in clutter. Resolution, ambiguities, and signal design. Moving-target indicators. Pulse Doppler radar. Radar antennas, phased arrays. Synthetic aperture and space-based radar. Prerequisite: EE 133, 204. (Spring)
- 255 **Optical Processing** (3) Kahn and Staff  
Fourier transforms by diffraction of light, optical spectrum analysis, optical memories and systems, holography and holographic techniques, properties and techniques for photographic reproduction. Prerequisite: EE 201. (Fall, even years)
- 256 **Speech Processing** (3) Garcia and Staff  
Speech processing, including analysis, perception, coding compression and synthesis. Speech recognition and modeling. Spectral analysis and sampling. Features of speech. Cepstral analysis. Coding speech for data transmission. Use of codebooks for speech recognition. Various speech recognition systems. Prerequisite: EE 117 or 201. (Fall)
- \*257 **Secure Communications** (3) Pickholtz and Staff  
Spread-spectrum techniques, time and frequency hopping, direct sequence encoding. Link jamming models and jamming effectiveness. Adaptive null steering arrays, nulling algorithms. Low probability of intercept. Code division multiple access. Prerequisite: EE 243. (Fall, even years)
- \*258 **Radio Communications Systems I** (3) Lang and Staff  
Analysis and design of microwave communications systems. Free-space propagation, knife-edge diffraction, atmospheric refraction and troposcatter. Time-variant channel characterization. Diversity reception. Spectral characteristics of radio signals. Design of line-of-sight, troposcatter, and cellular mobile systems. Prerequisite: EE 133, 243. (Fall)
- \*259 **Radio Communications Systems II** (3) Lang and Staff  
Analysis and design of ionospheric communication systems. Morphology of the ionosphere and propagation of ionospherically reflected radio waves. RAKE receiver and adaptive channel equalization. Wideband HF, atmospheric noise, and non-Gaussian channel performance. Design of VLF, LF, HF, and meteor-burst systems. Prerequisite: EE 258 or permission of instructor. (Spring)
- \*260 **Applied Superconductivity** (3) Harrington and Staff  
Thermodynamic and quantum properties of superconductors. High-temperature superconducting materials. Electrical and magnetic characteristics. Material preparation. Wire construction. The theory of superconducting magnets, transformers, machines and applications to computers. Prerequisite: permission of course director. (Fall, even years)
- \*261 **Electromechanical Energy Conversion** (3) Harrington and Staff  
Characteristics of synchronous machines, synchronous reactance, reactance theories, synchronizing generators and parallel operation of machines, characteristics of asynchronous machines, machines as circuit elements. Steady-state and

dynamic performance of alternating current machines. Prerequisite: EE 202, 206, or permission of course director. (Spring, even years)

**\*262 Power Electronics (3)** Harrington and Staff

Dynamic requirements of industrial drives. Detailed analysis of inverter circuits. Frequency control of inverter drives and cycloconverters. Computer modeling of rectifier and inverter circuits. Feedback control loops and their effect on stability. Prerequisite: EE 177 or permission of course director. (Spring, even years)

**263 Emergency and Standby Power Systems (3)** Harrington and Staff

General requirements and guidelines. Factors affecting power-line disturbances. Characteristics of system protection. Disturbance effects on computer power supplies. Grounding and noise control. Reliability evaluation from an economic viewpoint. Practical application problems. Prerequisite: EE 202, 206, or permission of course director. (Spring, odd years)

**\*264 Direct Electrical Energy Conversion (3)** Harrington and Staff

Theory and practice for direct production of electricity using solar cells, thermionic converters, fuel cells, and batteries. Concepts of solid-state energy bands, work function and conversion efficiency, and limitations. Prerequisite: EE 202, 206, and permission of course director. (Fall, odd years)

**265 Transients in Electrical Power Lines (3)** Harrington and Staff

Switching and lightning surges and the resultant overvoltages on long lines. Breaker closing sequence effects and effect of source side inductance and multiple infeeds. Recovery voltage after short line faults. Methods and effectiveness of protection. Calculation of overvoltages and insulation level requirements. Prerequisite: EE 202, 206, or permission of course director. (Fall, odd years)

**266 Electrical Power Transmission I (3)** Harrington and Staff

EHV AC power transmission. Overhead line and underground cable transmission systems. Symmetrical components; short-circuit studies; load flow, transient stability, and sustained fault analysis; multimachine systems; machine and system modeling. Prerequisite: EE 178, 261, 265. (Spring, even years)

**267 Electrical Power Transmission II (3)** Harrington and Staff

Practical studies using a computer in the following areas: load-flow analysis, short-circuit analysis, transient stability, design of power system networks, insulation coordination. Prerequisite: EE 266. (Fall, even years)

**268 Electrical Power Distribution (3)** Harrington and Staff

Transformer and insulation design at distribution voltage levels. Medium- and low-voltage switchgear requirements. Protective relaying, harmonic filtering, power-factor correction, grounding systems. Prerequisite: EE 178, 202, and permission of course director. (Spring, odd years)

**269 Issues in Electrical Power (3)** Harrington and Staff

Assessment of various energy systems. Interfacing of different types of energy systems. Dispersed generation: concepts of conversion and cogeneration. Pollution control. Biological effects of high electric and magnetic fields. Prerequisite: EE 264, 267, and permission of course director. (Spring, odd years)

**\*271 Linear Multivariable Controls (3)** Carroll and Staff

Control of systems having multiple inputs or outputs. Frequency-domain techniques in linear quadratic Gaussian, loop transfer recovery,  $H^\infty$ , and Nyquist array design. Prerequisite: EE 172, 202, 273. (Spring, even years)

**272 Computer Control Systems (3)** Carroll and Staff

Analysis of automatic control systems in which the control procedure uses on-line digital computation. Topics include single- and multirate sampling, z-transforms, responses of discrete systems, stability criteria, and discrete control design. Prerequisite or concurrent registration: EE 202. (Fall)

**273 System Optimization (3)** Carroll and Staff

Parameter optimization problems, theory of minima and maxima. Optimization problems for dynamic systems, calculus of variations, the maximum principle and the Hamilton-Jacobi equation. Optimization problems with constraints, optimal feedback systems. Numerical solution of optimal problems. Prerequisite: EE 202 or equivalent. (Spring)

**\*274 Nonlinear Systems (3)** Carroll and Staff

Definition of linear and nonlinear systems; introduction to approximate analysis of nonlinear systems—describing functions, Krylov and Bogoliubov asymptotic method, and Tsytkin locus. Forced oscillations—jump resonance. Stability



- analysis—Liapunov criterion. Lur  problem and Popov method. Prerequisite: EE 202. (Spring, odd years)
- \*275 **Identification and Adaptive Control** (3) Carroll and Staff  
Identification is the process of mathematically modeling a system based on measurement data that may be limited or uncertain. Adaptive control is the means whereby a system that is poorly modeled is adequately controlled. Various approaches to each of these problems are discussed. Prerequisite: EE 202, 204. (Spring, even years)
- 276 **Design of Robotic Systems** (3) Carroll and Staff  
Topics related to robotics: coordinate transformations, kinematics, dynamics of robot manipulator arms, trajectory planning, sensors, internal transmissions, actuators, robot control systems design, vision systems, and programming languages. Prerequisite: ApSc 58, CSci 100. (Spring)
- \*277 **Satellite Systems** (3) Pickholtz and Staff  
Theory and applications of satellite communications. Modulation and multiple-access techniques. Link design. Satellite transponders and antenna systems. Ground stations. VSAT networks. Random-access techniques and satellite packet communications. Prerequisite: EE 244. (Fall)
- 278 **Spacecraft Systems Design** (3) Heller and Staff  
Space environment; structure, propulsion, control, and instrumentation of spacecraft—launch, orbit, transit, and reentry problems; bioastronautic considerations. Prerequisite: graduate status. (Spring, even years)
- \*279 **Stochastic Control Systems** (3) Lee and Staff  
Introduction to random process in control systems. Properties of Markov process, systems of covariance equivalence and of deterministic and stochastic control equivalence; dynamic programming for Markov process—principle of optimality; linear systems with quadratic cost, Kalman filtering, smoothing, and predicting. Prerequisite: EE 204, 273. (Fall, odd years)
- 280 **Medicine for Engineers I** (3) Eisenberg and Staff  
The physiology of the human body from a systems viewpoint. Concepts of cellular structure and function integrated into the tissues and organs and related to the various systems of the body. Interrelationships of the body systems. (Fall)
- 281 **Medicine for Engineers II** (3) Eisenberg and Staff  
Further elaboration of physiological systems, such as the endocrine system, renal physiology, gastrointestinal physiology; integration of the separate systems to present the functioning of the body as an overall system. Prerequisite: EE 280. (Spring)
- 282 **Medical Measurements I** (3) Eisenberg and Staff  
Theory of measurements in biological areas, techniques for electronic measurements on biological specimens, current problems in medical metrology, stressing electronic systems. Prerequisite: EE 280 or permission of course director. (Fall)
- 283 **Medical Measurements II** (3) Eisenberg and Staff  
Medical telemetry systems, medical use of the computer, engineering techniques in patient treatment, principles of good medical instrumentation. Prerequisite: EE 280 or permission of course director. (Spring)
- 285 **Evoked Potentials I** (3) Eisenberg and Staff  
Physiological significance of the sensory-evoked potentials, stimulation variables, subject variables, data acquisition procedures and instrumentation, signal-averaging computers, analysis techniques for the VEP, applications of the VEP. Lectures, discussion, and laboratory. Prerequisite: EE 281, 282, 283, or permission of course director. (Fall)
- \*286 **Clinical Medicine for Engineers** (3) Eisenberg and Staff  
Overview of clinical medicine with emphasis on those areas most affected by engineering and technology. Prerequisite: EE 281, 282, 283. (Fall, even years)
- 287 **Rehabilitation Medicine Engineering** (3) Eisenberg and Staff  
Cross-sectional view of those areas of medicine most involved with the treatment of handicapped individuals. Application of engineering theory and techniques to the rehabilitation of handicapped individuals. Major problem areas and general solutions, solutions to some specific problems. Prerequisite: EE 289. (Spring, odd years)

- 297 Special Topics (1 to 3)** Staff  
Topics to be announced in the *Schedule of Classes*. (Fall and spring)
- 298 Research (arr.)** Staff  
Applied research and experimentation projects, as arranged. May be repeated for credit.
- 299-300 Thesis Research (3-3)** Staff
- 317 VLSI for DSP Systems (3)** Zaghoul and Staff  
VLSI design techniques as applied to DSP systems. CAD tools and standard library design techniques; algorithms and architectures for DSP systems in VLSI. Systolic arrays; parallel and pipelined architecture in DSP. Transform and digital filter algorithms. Prerequisite: EE 252. (Spring, odd years)
- 319 Systems Science, Networks, and Controls Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)
- \*321 Mathematical Techniques for Electromagnetics (3)** Lang and Staff  
Asymptotic methods for Maxwell's equations, geometric optics, WKB approximation for stratified media, uniform expansion near a caustic and shadow boundary. Perturbation techniques for tenuous medium: Rayleigh-Gans approximation, smoothing, and multivariable methods for stochastic problems. Prerequisite: EE 204, 207. (Spring, every third year)
- \*322 Waveguide Diffraction (3)** Kahn and Staff  
Selections from the following. Analytical treatment of waveguide bifurcations and discontinuities by Wiener-Hopf, mode matching, static approximation. Small apertures (obstacles) in waveguides. Variational methods for evaluation of equivalent circuit parameters. Group theoretic methods for symmetrical junctions. Prerequisite: EE 233. (Fall, every third year)
- 323 Principles of Microelectronics (3)** Heller and Staff  
Basic principles, techniques, and processes necessary for understanding microelectronics. Semiconductor physics, phase diagrams, crystal growth, epitaxy, vacuum techniques, thin-film deposition, diffusion, oxidation, junction formation, masking, and properties of thin films and materials. Prerequisite: EE 222 or equivalent. (Fall, odd years)
- 329 Electrophysics Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)
- \*335 High-Resolution Array Antennas (3)** Wasylkiwskyj and Staff  
Review of electromagnetic-wave propagation; radiation and reception by array antennas; antenna arrays as multipoint receivers. Angle-of-arrival estimation using MUSIC and related techniques. Application to radar multipath problems and angle-of-arrival estimation. Prerequisite: EE 204, 207. (Fall, even years)
- \*345 Advanced Signal Processing (3)** Pickholtz and Staff  
Linear estimation, Wiener and Kalman-Bucy filters, nonlinear phase-lock loops, rate-distortion theory. Gaussian processes, detection and parameter estimation, canonical receivers, structures, and performance calculations for diversity systems, multiple-pulse radars, array processing. Prerequisite: EE 245. (Spring)
- \*346 Telecommunications Protocols (3)** Helgert and Staff  
Layered protocol models for computer communications networks. Open systems interconnection reference model. CCITT and ISO protocol standards in support of OSI. Proprietary communications architectures. TCP/IP, SNA, and DNA. Protocols for local area networks and integrated services digital networks. Prerequisite: EE 248. (Fall)
- \*347 Telecommunications Software Engineering (3)** Helgert and Staff  
Formal description techniques for protocol specification. Graphical and matrix representations of finite-state protocol models. Specification and Description Language (SDL) and CCITT High-Level Language (CHILL). Software implementations of computer communications protocol architectures. Prerequisite: EE 346. (Spring)
- \*348 Telecommunications Networks (3)** Helgert and Staff  
Wide-area circuit-switched and packet-switched data communications networks. Subscriber access arrangements and subscriber signaling systems. Network management, services, and performance. Local and metropolitan area networks. IEEE protocol standards. FDDI: narrowband and broadband integrated services digital networks. Prerequisite: EE 248. (Fall, odd years)



- 349 **Communications Research** (arr.) Staff  
 Limited to students preparing for the Doctor of Science qualifying examination.  
 May be repeated for credit. (Fall and spring)
- 364 **Direct Energy Conversion** (3) Harrington and Staff  
 Electrostatic and magnetic conversion systems, conversion of heat to electricity, thermoelectric systems, conversion of light to electricity, fuel cells and batteries, magnetohydrodynamic systems, superconductive machines and systems. Prerequisite: EE 264. (Spring, even years)
- 368 **High-Voltage Test Techniques** (3) Harrington and Staff  
 Methods and procedures for measurement of high voltage; basic testing techniques for alternating voltages, direct voltages, lighting-impulse voltages, switching-impulse voltages, and impulse currents. Determination of the dielectric strength of electrical insulation materials at power frequencies. The use of sphere gaps for the measurement of peak values. (Spring, even years)
- 371 **Simulation Methods** (3) Bock and Staff  
 Survey of simulation languages. Techniques of model building for material- and machine-based systems. Treatment of these systems with notion of transactions and states. Modeling the dynamic processes of growth problems. Analog, hybrid, and digital methods for simulation. Prerequisite: CSci 278. (Fall, odd years)
- \*372 **Control of Large Systems** (3) Lee and Staff  
 Systems as multistage decision processes. Analytical concepts of model making and matrix representations of large systems. Approximation by models of lower dimension: reduction to simplified models, decentralized systems. Differential games, computation of saddle points, construction of an equilibrium point. Prerequisite: EE 273. (Fall, even years)
- \*381 **Analysis of Physiological Signals** (3) Loew and Staff  
 Acquisition of data from the cardiovascular, pulmonary, and nervous systems. Sources and detection of the signals; physiological limitations; preprocessing and noise reduction. Transformations, data reduction, representation, display, and decision aiding for clinical use. Computer projects. Prerequisite: EE 280, 281, 282, 283, and permission of instructor. (Fall, even years)
- \*382 **Physiological Controls and Systems** (3) Loew and Staff  
 Some applications of control and systems theory in the medical and biological fields. Application of general control and systems theory as applied to physiological systems. Specific applications of control and systems theory to the visual system, respiratory system, cardiovascular system, and musculoskeletal system. Prerequisite: EE 172 or equivalent, 281, 282, 283. (Spring, even years)
- \*383 **Bioelectric Phenomena and Bioelectromagnetics** (3) Eisenberg and Staff  
 Mathematical treatment of bioelectric phenomena: membrane, dynamics, potentials, and subthreshold effects; solid-state phenomena; nerve propagation. Electromagnetic interactions with biological systems; energy absorption and heat production; diagnostic and therapeutic applications of electromagnetic energy. Prerequisite: EE 206, 280, 281, 282, 283. (Fall, odd years)
- \*384 **Medical Imaging** (3) Loew and Staff  
 Principles of projection radiography, fluoroscopy, tomography, ultrasound, and nuclear sources (PET, SPECT); biomagnetic imaging. Characterization of source and object; recorder resolution and noise. Scatter and attenuation. Reconstruction algorithms and implementations for CT and MRI. Recent developments. Prerequisite: EE 201 or equivalent, 280, 281, 282, 283. (Fall, odd years)
- \*385 **Special Topics in Medical Engineering** (3) Loew and Staff  
 Exploration of theoretical or technical advances in medical engineering. Topic to be announced in the *Schedule of Classes*. (Fall and spring)
- 389 **Medical Engineering Research** (arr.) Staff  
 Limited to students working on the Doctor of Science dissertation. May be repeated for credit. (Fall and spring)
- 390 **Colloquium** (0) Lang and Staff  
 Lectures by outstanding authorities in electrical engineering and computer science. Topics to be announced each semester. (Fall and spring)
- 399 **Dissertation Research** (arr.) Staff  
 Limited to Doctor of Science candidates. May be repeated for credit.
- 450 **Telecommunications** (3) Pickholtz and Staff  
 Elements of telecommunications system, representation of signals in the frequency domain, and bandwidths of voice, data, and video signals. Signal and

noise distortion, and channel capacity. Modulation, multiplexing, and digital communications. May not be applied toward a graduate degree in the School of Engineering and Applied Science. (As arranged)

- 451 **Telecommunications Systems** (3) Pickholtz and Staff  
Introduction to the use of microwave, fiber-optic, and satellite computer communications systems. Local area networks, packet-switched networks, routing algorithms, and performance. May not be applied toward a graduate degree in the School of Engineering and Applied Science. Prerequisite: EE 450 or permission of instructor. (As arranged)
- 452 **Telecommunications Technology** (3) Pickholtz and Staff  
Advanced topics and recent technological developments in telecommunications, including traffic theory, switching systems, error detection and correction, ISDN, cellular radio systems, and security and privacy in communications. May not be applied toward a graduate degree in the School of Engineering and Applied Science. Prerequisite: EE 451 or equivalent. (As arranged)

## COMPUTER SCIENCE

- 201 **Introduction to Computer Systems** (3) Bock and Staff  
Programming digital computers in high-level and assembly languages. Architecture of traditional von Neumann and stack-based computers. Techniques in machine control and memory addressing. Number systems and codes. Software engineering. May not be taken for graduate credit by majors in computer science. Prerequisite: Pascal assembly language programming. (Fall and spring)
- 203 **Microprocessor System Design** (3) Alexandridis and Staff  
Design of 32-bit CISC and RISC microprocessor-based systems. Microprocessor (CPU) and system architecture. CPU and system buses and signals. Architecture support for pipelining, caching, interleaving, task switching, memory management, multiprocessing. Prerequisite: CSci 182 or permission of course director. (Fall and spring)
- 212 **Discrete Analysis in Computer Science** (3) Berkovich and Staff  
Combinatorial theory: permutations and combinations, generating functions, recurrence relations, the principle of inclusion and exclusion. Polya's theory of counting. Block designs. Applications to the analysis of algorithms, computer organization, VLSI placement, coding theory, simulation, and other problems. Prerequisite: CSci 133 or permission of instructor. (Fall)
- 215 **Advanced Data Structures** (3) Berkovich and Staff  
Sparse matrix transpose and multiplication. List insertion and deletion, lists of available space. In-order, preorder, and postorder traversal of trees. Topological sorting. Binary search trees, including AVL trees, B-trees, and tries. Lattice search. Dynamic hashing. Prerequisite: CSci 133, 144. (Spring)
- 216 **Information Retrieval Systems** (3) Berkovich and Staff  
Information organization and retrieval of natural language data by digital computer systems; statistical, syntactic, and logical analysis of natural language; dictionary and thesaurus systems; searching strategies and cataloging. Large-scale file structures. Prerequisite: CSci 144 or permission of instructor. (Spring)
- 217 **Computing Algorithms I** (3) Youssef and Staff  
Design and analysis of basic classes of algorithms: divide-and-conquer, greedy dynamic programming, tree and graph traversals, backtracking, branch-and-bound. Applications to problems such as sorting and searching, graph coloring, traveling salesperson, knapsack, and scheduling. Lower bound theory. NP-complete problems. Prerequisite: CSci 131, 144. (Fall and spring)
- \*218 **Computing Algorithms II** (3) Choi and Staff  
Graph algorithms, strongly connected components, biconnected components, dominators in acyclic graphs, ordered trees, network flow, planarity testing, bipartite matching, theory of NP completeness, NP-complete problems. Design and analysis of approximation algorithms for NP-complete problems. Prerequisite: CSci 217. (Fall and spring)
- 219 **Computer Graphics II** (3) Hahn and Staff  
Curves and surfaces. Spatial sampling and aliasing. Visible surface algorithms. Illumination and shading models, raytracing and radiosity. Texture mapping.



- Stochastic models. Physically based models. Prerequisite: CSci 185, 217 or 258. (Spring)
- \*220 **Pattern Recognition (3)** Loew and Staff  
Random vectors, transformations. Hypothesis testing, error probability, sequential methods. Bayes, other linear classifiers. Parameter estimation, learning, and dimensionality reduction. Nonparametric methods: clustering; feature selection and ordering. Syntactic methods; grammatical inference. Computer applications and projects. Prerequisite: EE 204. (Fall)
- 221 **Adaptive Learning Systems I (3)** Bock and Staff  
Learning as an alternative to rule-based schemes for artificial intelligence. Deterministic and probabilistic simulation of games. Markovian and bounded-context systems. The algedonic process. Introduction to collective learning systems theory. Design, simulation, and evaluation of collective learning automata. Prerequisite: CSci 174, 232. (Fall)
- 222 **Design of User-Computer Dialogues (3)** Sibert and Staff  
Design of dialogues for interactive systems. Psychological, physiological, linguistic, and perceptual factors. Advantages and disadvantages of various interaction techniques, command language syntaxes, and data presentations. Design methodology and guidelines. Case studies, research readings, and projects. Prerequisite: CSci 144 or permission of course director. (Spring)
- 224 **Artificial Intelligence (3)** Garcia and Staff  
Representation and space search. Heuristic search. Predicate calculus. Knowledge representation and knowledge engineering for expert systems. Rule-based, hybrid, and O-O systems. Semantic nets, frames, and natural language. Theorem provers. Overview of planning, learning, neural nets. Use of AI languages. Prerequisite: CSci 174, 232. (Fall and spring)
- \*226 **Robotics Survey (3)** Bock and Staff  
Manipulator and sensor technology. Feedback loops and analog servos. Multiple degrees of freedom and coordinate systems. Joint-space-work-space transformations. Point-to-point continuous path control. Robot control: command languages, navigation and mapping, collision avoidance. Distribution of intelligence. Adaptive hierarchical control. Prerequisite: CSci 174. (Spring)
- 227 **Database Systems (3)** Rotenstreich and Staff  
Concepts in management information systems. Inverted files and query systems. Editing, report generation, updating, and updating load. Trade-off between direct access and indexed-sequential access. Construction of database management systems. Conceptual and logical design of a database. Prerequisite: CSci 144. (Fall)
- 228 **Models of Cognition (3)** Bock and Staff  
The central nervous system as a natural precedent for AI: structure and function of the neuron and neural networks; sensors and actuators; modular brain function. The cognitive process. Intelligence metrics. Genetics and self-organizing systems. Memory mechanisms. The psychological basis of learning and behavior. Prerequisite: ApSc 115; CSci 174. (Spring)
- 229 **Computer Security Systems I (3)** Hoffman and Staff  
Techniques for security in computer systems. Authentication, logging, authorization, encryption, statistical inference controls. Effects of operating systems and machine architecture, countermeasures, risk-analysis systems. Companion course to EE 250. Prerequisite: CSci 144 or equivalent. (Fall)
- 231 **Sequential Machines (3)** Friedman and Staff  
Finite-state sequential machine theory and design, state identification, information losslessness, state minimization in incompletely specified tables, partition theory, decomposition of machines, asynchronous machine design, structural simplicity, and design with ROMs and PLAs (planar logic arrays). Prerequisite: CSci 133, 182. (Fall, even years)
- 232 **Automata and Formal Languages (3)** Narahari and Staff  
Regular expressions. Turing machines, recursive functions, predicate calculus, and computability. Formal language theory, including grammatical construction, recognizers, relationships between machines and grammars. Prerequisite: CSci 133, 140, 144. (Fall and spring)
- \*235 **Parallel Computer Architecture (3)** Meltzer and Staff  
Introduction to high-speed computer architecture. Parallel architecture, memory and I/O subsystems. Principles of pipelining and vector processing, pipeline

computers and vectorization methods, examples of vector processors. Structures and algorithms for array processors, SIMD computers, interconnection networks, associative array processors. Prerequisite: CSci 182. (Fall)

- \*239 **Comparative Computer Systems** (3) Youssef and Staff  
Structures of computers and a system description language. History, characteristics, and philosophies of different computer structures. Special-purpose processors, multiprocessors, networks, and time-shared systems. Comparison of computer families. Performance evaluation. Effects of software and technology on computer structures. Prerequisite: CSci 182. (Spring)
- \*240 **Microprogramming** (3) Friedman and Staff  
Basic concepts, techniques, and theory of microprogramming. Microprogramming languages, assemblers, and hardware simulators, including specific applications of these to the design of current computer systems and their interfaces with real-time systems. Prerequisite: CSci 182. (Spring, even years)
- 243 **Fault-Tolerant Systems** (3) Friedman and Staff  
Fault-test generation for combination and sequential circuits, digital simulation as a diagnostic tool, design of easily tested and fault-tolerant systems. Prerequisite: CSci 182. (Fall, odd years)
- 244 **Data Communications** (3) Meltzer and Staff  
Modems, multiplexers, concentrators. Line control procedures. Buffer management, message reassembly, queue control. Distributed processing; terminal-oriented systems, data-collection loops, multidrop lines. Switched data systems; circuit and packet switching. Error control, cryptosecurity. Prerequisite: CSci 144, 182, or permission of course director. (Spring)
- \*245 **Computer System Performance** (3) Meltzer and Staff  
Queuing models of computer systems and applications of queuing theory to computer modeling. Bounds on system performance. Mean-value analysis of computer systems. Modeling specific subsystems. Queuing models for analysis. Limitations of queuing models. Analysis of transaction processors, terminal-oriented systems, and batch processing. Prerequisite: CSci 182. (Fall)
- 247 **Systems Programming** (3) Maurer and Staff  
Use of a macroassembler in structured programming. Conditional assembly. Design and programming of an assembler, macrogenerator, and loader. Prerequisite: CSci 120, 131. (Spring)
- 255 **Program Correctness** (3) Maurer and Staff  
How to prove, mathematically, that a computer program properly satisfies its specifications. Correctness, partial correctness, termination, run-time errors. The inductive assertion method, verification conditions and their generation and proof. Applications to algebraic and assembly languages. Prerequisite: CSci 258. (Fall, even years)
- \*256 **Design of Translators** (3) Feldman and Staff  
Introduction to programming language implementation. Overview of compilers, interpreters, and assemblers. Lexical analysis. Classical parsing techniques. Symbol tables and static semantic analysis. Code generation and run-time environments. Student-selected term project. Prerequisite: CSci 232, 258. (Fall)
- 258 **Advanced Programming Languages** (3) Feldman and Staff  
Issues in modern programming languages. Data abstraction. Classical and experimental control structures. Exception handling. Portability and standardization of programming languages. Comparison of paradigms such as imperative, functional, and object-oriented; trade-offs between compiled and interpreted language. Prerequisite: CSci 133, 144. (Fall and spring)
- \*267 **Operating Systems I** (3) Rotenstreich and Staff  
Concurrency, concurrent programming, deadlocks, hardware support for operating systems, resource management, virtual memory, introduction to distributed operating systems. Prerequisite: CSci 217. (Fall)
- \*268 **Operating Systems II** (3) Rotenstreich and Staff  
Advanced concurrency, distributed mutual exclusion, distributed deadlock detection, fault tolerance in distributed systems, load balancing, job migration, transactions and concurrency control, checkpointing and rollback, issues in distributed and parallel environments. Prerequisite: CSci 267. (Spring)
- \*270 **Software Engineering** (3) Rotenstreich  
The life-cycle model. Requirements and specifications. Design models, structured and object-oriented design. Program development, PDL's tools, configura-



- tion control. Program, unit, and integration testing. Program verification. Other development models. Development metrics. Computer-aided software engineering (CASE). Prerequisite: CSci 217, 258. (Spring)
- 271 **Software Engineering Development (3)** Rotenstreich and Staff  
Formal methods in software engineering. First-order logic, basic specification elements, rigorous proofs, formal development process, concurrency. Prerequisite: CSci 217. (Fall)
- 275 **Educational Software Design (3)** Heller and Staff  
History and types of computer-based learning (CBL). Scripted and generative design strategies, authoring systems, data collection, operation of external apparatus, and artificial intelligence. Dissemination and legal issues. Models of learning theory. Case studies. Prerequisite: CSci 144. (Fall)
- 276 **Object-Oriented Design (3)** Rotenstreich and Staff  
Object-oriented systems, software reusability, software modularity, top-down and bottom-up approaches, object classification, genericity, metaprogramming, concurrent object-oriented programming languages. Prerequisite: CSci 258. (Spring)
- 281 **Solutions of Algebraic Systems (3)** Della Torre and Staff  
Numerical solutions of linear algebraic equations and the algebraic eigenvalue problem. Sparse matrix techniques. Solutions of nonlinear simultaneous equations. Multidimensional search algorithms. Interpolation and extrapolation. Prerequisite: CSci 155. (Fall)
- 282 **Solutions of Ordinary Differential Equations (3)** Della Torre and Staff  
Numerical solutions of problems in one dimension. Calculus of finite differences in the derivation of the solution methods. Numerical quadrature; zeros of functions and zeros of polynomials; finite difference, predictor-corrector, and Runge-Kutta methods; boundary-value and eigenvalue problems of ordinary differential equations. Prerequisite: advanced calculus. (Spring, even years)
- 283 **Numerical Solutions to Field, Wave, and Diffusion Problems (3)** Della Torre and Staff  
Finite difference, finite element, and boundary element methods. Eigen-function solutions. Boundary approximation. Graphical presentation of results. Convergence acceleration techniques. Prerequisite: CSci 281. (Spring, odd years)
- 285 **Approximation of Functions (3)** Meltzer and Staff  
Review of linear spaces; least squares, orthogonal functions; nonlinear techniques, gradient search methods; parameter estimation with discrete data; Tchebysheff approximation; approximation and curve fitting by spline functions and Bernstein polynomials. Prerequisite: CSci 155. (Fall, odd years)
- 297 **Special Topics (1 to 3)** Staff  
Topics to be announced in the *Schedule of Classes*. (Fall and spring)
- 298 **Research (arr.)** Staff  
Applied research and experimentation projects, as arranged. May be repeated for credit.
- 299-300 **Thesis Research (3-3)** Staff
- \*319 **Computer Graphics III (3)** Hahn and Staff  
Advanced topics in computer graphics. Computer animation, physically based image synthesis and motion control. Multiple-processor display system architectures. Window managers and user interface management systems. Current topics. Prerequisite: CSci 219. (Fall, even years)
- \*320 **Computer Vision (3)** Loew and Staff  
Image processing; edge detection, segmentation, local features, shape and region description in 2D and 3D. Insights from human vision. Representation for vision: object models, synthetic images, matching, gaps, algorithms. Inference, production system, syntactic networks. Planning, spatial reasoning for robot vision. Prerequisite: CSci 220, 224. (Spring)
- \*321 **Adaptive Learning Systems II (3)** Bock and Staff  
Alternative memory structures. Selection and modification policies. Environmental models and evaluation policies. Metrics for performance evaluation of collective learning systems automata. Self-organizing, hierarchical networks of collective learning cells. Prerequisite: CSci 221, 224. (Spring)
- \*322 **Natural Language Understanding (3)** Bock and Staff  
The state of the art of natural language parsing and semantic understanding by computer systems. Review of formal, context-free, and transformational gram-

mars and parsing. Augmented transition networks: problems of complexity, semantics, and context. Deterministic parsing and semantic parsing. Prerequisite: CSci 224. (Spring)

**\*324 Knowledge-Based Systems (3) Senay and Staff**

The design, structure, and application of knowledge-based systems. Topics include: acquisition, representation, and processing of expert knowledge, knowledge-based system architectures, development tools, and user interfaces. Survey of existing knowledge-based systems. Student projects involve designing expert systems and development tools. Prerequisite: CSci 224. (Fall)

**\*327 Advanced Information Systems (3) Berkovich and Staff**

Special topics, such as architecture of information systems, organization of large dynamic files, multidimensional search, user interfaces, and database machines. Students are encouraged to present reports in information systems research. Prerequisite: CSci 131 and one course chosen from CSci 215, 216, or 226; or permission of course director. (Fall, odd years)

**329 Computer Security Systems II (3) Hoffman and Staff**

Advanced topics in information systems security. Intrusion detection, expert systems, viruses, advanced risk analysis methodologies, computer security models, computer network security, and statistical inference. Prerequisite: CSci 229. (Spring)

**335 Advanced Computer Architecture (3) Meltzer and Staff**

Array processors, SIMD computers, performance enhancements, multiprocessor architecture, MIMD processors. Interconnection networks, memory organization, concurrency problems. Multiprocessing control algorithms, deadlock problems, synchronization, parallel algorithms, data flow computers. Prerequisite: CSci 235. (Spring)

**\*337 VLSI Systems Organization (3) Berkovich and Staff**

Impact of VLSI on computer systems design. Computational models for concurrent processing. Parallel algorithms. Concept of cellular automation. Processor arrays. Associative processing. Computer communications. Redundancy and reliability. Specialized applications of VLSI systems. Prerequisite: CSci 217, EE 214, or equivalent. (Fall, even years)

**\*345 Advanced System Performance (3) Meltzer and Staff**

Methods of performance evaluation, measurement techniques and tools, instrumentation and simulation methods; analytical techniques, including analysis of CPU-I/O overlap. Work-load characterization, artificial and synthetic workloads. Evaluation of program performance. Prerequisite: CSci 245. (Spring, odd years)

**\*358 Concurrency and Parallelism (3) Feldman and Staff**

Programming language models for the support of concurrency, parallelism, and distributed processing. Tasks and rendezvous, semaphores, synchronization, monitors, and message passing. Language support for distributed processing. Student projects. Prerequisite: CSci 258 or permission of instructor. (Spring, even years)

**390 Colloquium (0) Lang and Staff**

Lectures by outstanding authorities in electrical engineering and computer science. Topics to be announced each semester. (Fall and spring)

**391 Computer Science Research (arr.) Staff**

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.

**399 Dissertation Research (arr.) Staff**

Limited to Doctor of Science candidates. May be repeated for credit.

## ENGINEERING MANAGEMENT

Professors H.M. Steiner, R.C. Waters, E.L. Murphree, Jr. (Choir), B.G. Silverman, H. Eisner, J.F. Dinwiddie, G.R. Brier

Adjunct Professors R.R. Romano, J.P. Deason

Professorial Lecturers C.W. Fotis, W.A. Goetz, R.R. Blanchard, S.F. Pauls, H.S. Kimmel, H.J.

Peake, C.C. Myers, Jr., J. Costantino, J.L. Pokorney, G.B. Dove, R.W. Kopka, J.R. Offutt, T.L.

Azorzy, R.F. Burch, G.T. Patton, G.L. Pauler, L.W. Transeau, H. Haberman, F.S. Reeder,

B.T. Lewis, W.T. Marquitz, J.C. Matthews III, R.W. Witzel, J.D. Liveris, S.O. Mauldin,

E.A. Edelsack, N. Gerstanzang, S. Stollmack



**Associate Professors** J.R. Harrauld, T.A. Mazzuchi, M.L. Donnell, R.S. Scotti

**Adjunct Associate Professor** J.F. Patrick

**Associate Professorial Lecturers** V.R. Hayles, I.S. Raju, R.W. Doyon, F. Allario, W.P. Henderson, L.E. Putnam, R.B. Davis, J.E. Harris, M.R. Habib, A.A. Moghadam, J.L. Rogers, Jr., A.G. Cotterman, M.G. Goedde, A. Procko, F.H. Stoodley, S.M. Wander, R.D. Hofler, D. Gantzer, F. Hatfield, N. Kaplan, N. Fahed, M.P. Clark, B.A. Brower, N.D.C. Boughy, A.J. Murray

**Assistant Professors** S.A. Papantonopoulos, L. Xue, M.R. Duffey

**Assistant Professorial Lecturers** P.G. Meikle, F. Suber, Jr., S.M. Janssen, K. Nidiffer, W. Webb, W.A. Van Dyke, Jr., F. Whiton, Jr., J.E. Tryon, J. Moss, C. Smith, A.L. Vopatek, P.A. Massimini, A. Green, M.T. Wells, M.H. Alhabashi

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

**204 Management of Engineering Contracts (3)** Goetz and Staff  
Study of the total contracting process (including initial budget preparation and justification, execution of a contract, and administration of the contract to completion) considered from the viewpoints of the industrial and government buyer and the seller of technical materials and services. (Fall and spring)

**207 The Human Resources Function for Engineering Managers (3)** Fotis and Staff  
Principles, theory, and practical considerations of the human resources function for engineering managers, with applications for engineering management. Issues and case studies examined within the context of the totality of the process of management as well as the dynamics of human resources management. (Fall)

**210 Engineering Law (3)** Staff  
Legal principles and procedures of interest to engineers. The American legal system, contracts and specifications, liability of professional engineers, product liability, agency relationships, patent and proprietary rights, special problems in research and development contracts. (Fall and spring)

**211-12 Engineering Management I-II (3-3)** Staff  
A comprehensive and systematic approach to management policies, principles, procedures, and practice. EMgt 211: Planning and organizing aspects of management. EMgt 212: Directing and controlling aspects of management. Prerequisite to EMgt 211: EMgt 150; prerequisite to EMgt 212: EMgt 211. (Fall, spring, and summer)

**217 Fundamentals of Artificial Intelligence (3)** Donnell and Staff  
History of AI, expert systems, knowledge representation, search and control techniques, natural language processing, computer vision, computer speech, robotics, knowledge-based systems, evidential reasoning, and features of the LISP and PROLOG languages. Hands-on experience with a knowledge-based shell. Laboratory required. (Spring)

**221 Environmental Management (3)** Scotti and Staff  
Technical, economic, political, administrative, and social forces influencing the quality of the environment and the use of resources. Government and industrial programs to combat pollution of the air, soil, and water. Existing and pending pertinent legislation; theoretical aspects of specific management problems; tools for assessing environmental impact. (Fall)

**222 Energy Management (3)** Scotti and Staff  
The function of the energy management office of a large organization, including planning, staffing, conducting energy audits, setting priorities, acquiring energy technology, and maintaining energy budgets. An energy conservation project is encouraged. (Spring)

**231 Program Management (3)** Romano and Staff  
Management science, the systems approach, and traditional managerial concepts applied to a variety of typical cases, such as technical programs and projects in government and industry. (Spring)

**241 Introduction to Construction Management (3)** Murphree and Staff  
Introduction to the construction industry: construction life cycles, bonding, bidding, contract types, legal and management structures, project and financial planning, equipment and labor costs, productivity, materials management, and labor relations. Recommended: EMgt 210. (Fall and spring)

- 242 **Construction Project Management (3)** Murphree and Staff  
Planning and managing the construction project from the point of view of the contractor. Planning and scheduling, using the critical path method. Use of standard industry references to estimate time, labor, and equipment requirements. Use of computers for project planning and control. Laboratory required. (Fall and spring)
- 243 **Construction Productivity and Logistics (3)** Murphree and Staff  
Factors affecting productivity at the construction site. Organization, planning of the work, procurement and delivery of materials; physiological and psychological factors influencing the behavior of workers; effects of overtime, rolling shifts, and weather on construction workers. Computer simulation to plan effective equipment ensembles. Laboratory required. (Fall and spring)
- 245 **Maintenance Management (3)** Staff  
Maintenance functions and the role of the technical manager in designing, supervising, and implementing maintenance programs. Topics include human aspects of maintenance, preventive and predictive maintenance statistical process control, use of engineered standards for maintenance, training, and measurement of performance. (Fall)
- 251 **Management and Development of Information Resources (3)** Harrauld and Staff  
Introduction to the analysis, design, and implementation of information systems, including feasibility studies, requirements analysis, specifications, hardware and software considerations, performance evaluation, implementation plans, and postmortem considerations. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 253 **Production Management (3)** Waters and Staff  
Consideration of production operations in the context of an integrated company strategy. Process and trade-off analyses, capacity management and planning, technology planning. (Spring)
- 254 **Computer Systems in Information Management (3)** Dinwiddie and Staff  
Use of computers in information systems, with emphasis on accounting applications. Introduction to microcomputer analytical tools, logic of computers, hardware and software concepts, and data communications. (Fall, spring, and summer)
- 255 **Management of Research and Development (3)** Waters and Staff  
Study of technological innovation as a vital part of the organizational adaptation process. Role of the technical manager in using organization, planning, and motivation to accomplish research and development objectives. (Fall)
- 256 **Survey of Information Systems (3)** Dinwiddie and Staff  
Information systems that provide support for management in areas such as finances, manufacturing, and marketing. Introduction to analysis of data flow, databases, and data communications. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 261 **Economic Analysis in Engineering Planning (3)** Steiner and Staff  
Case studies in economic analysis, capital budgeting, the price system and its adjustments, socioeconomic analysis. (Fall and spring)
- 262 **Finance for Engineers (3)** Waters and Staff  
Financial concepts encountered in engineering management: accounting concepts budgeting, cash management, valuation, leverage, financial statements, depreciation, credit, leasing, capital formation. (Fall and spring)
- 265 **Transportation Management I (3)** Waters and Staff  
Integration of social, technical, economic, and political considerations that shape transportation systems and their management. Focus on modal histories and relative advantages. (Fall)
- 266 **Transportation Management II (3)** Waters and Staff  
Investigation of the economics and management of a transportation mode, from U.S. and international perspectives. Topics include impact of technology, deregulation, and politics on the provision of transportation. (Spring)
- 269 **Elements of Decision Making and Problem Solving (3)** Mazzuchi and Staff  
Concepts and techniques used in analyzing management problems. Modeling decision problems using influence diagrams and decision trees; analyzing decision problems using probability models, subjective probability, decision criteria,



- value of information, utility theory, and multiobjective tradeoffs. Prerequisite: EMgt 170. (Fall, spring, and summer)
- 270 **Cooperating Expert Systems** (3) Silverman and Staff  
Concepts of knowledge engineering for distributed expert system agents, including cooperating blackboard architectures, knowledge-base representations, inference engine techniques, knowledge acquisition, and data knowledge server theory. Includes hands-on experience with expert systems tools. (Fall and spring)
- 271 **Introduction to Expert Systems Practice** (3) Silverman and Staff  
Introduction to expert systems on the personal computer, including knowledge engineering, rule-based coding, inference engine concepts, Lisp Language tools, and survey of available packages and trends. Includes a class project to build a prototype expert system application. Not permitted for SEAS doctoral credit. (As arranged)
- 281 **Systems Analysis and Management I** (3) Eisner and Staff  
The systems or holistic approach as a methodology for making decisions and allocating resources. Analysis by means of objectives, alternatives, models, criteria, and feedback. Prerequisite: EMgt 269 or equivalent. (Fall)
- 282 **Systems Analysis and Management II** (3) Eisner and Staff  
Case studies in systems analysis, including applications to industrial, economic, and military situations. Prerequisite: EMgt 281 or permission of instructor. (Spring)
- 283 **Systems Engineering I** (3) Eisner and Staff  
Systems approach to the architecting and engineering of large-scale systems; elements and techniques of systems engineering; computer tools that support systems and software engineering. Prerequisite: EMgt 269. (Fall)
- 284 **Systems Engineering II** (3) Eisner and Staff  
Specific applications of systems engineering tools and techniques; student projects. Prerequisite: EMgt 283 or equivalent. (Spring)
- 285 **Seminar: Management Issues** (3) Waters and Staff  
Analysis of complex issues affecting the practice of engineering management, with group evaluation and discussion. Prerequisite: 18 hours of graduate credit. (Fall and spring)
- 287 **Decision Support Systems and Models** (3) Silverman and Staff  
Impact of behavioral, managerial, and situational factors on choice of computer-based technique; simplified models. Management of the modeling process, including predesign, software costing (make or buy), development verification, validation and implementation cycles. Case studies. (Fall and spring)
- 288 **Technology Issue Analysis** (3) Eisner and Staff  
Contextual background and intellectual basis for addressing technology issues in the public and private sectors. Technology impact assessment, forecasting, and innovation; principles and practices of technology transfer as elements of a systematic approach to making technology decisions. (Fall)
- 290 **Human Factors Engineering** (3) Papantonopoulos and Staff  
Study of the human-machine interface applied to system design, job design, and technology management. Human sensory-motor, perceptual, and cognitive functions; task analysis and allocation; contextual aspects of human factors engineering. Modeling, design, and evaluation methodologies. Applications to user-centered industrial and information systems. (Fall)
- 293 **Technical Enterprises** (3) Eisner and Staff  
Essential features of technology-based companies from the entrepreneur's point of view. Team management of an enterprise in a computer-simulated environment. Designed for those working in technical firms and for government personnel who depend on technical firms as suppliers. (Fall)
- 294 **Marketing of Technology I** (3) Staff  
A classic marketing management approach, covering the broad functions of marketing. Emphasis on the technical manager's approach to marketing industrial products and technical services. (Spring)
- 295 **Management of Databases and Technical Information** (3) Harrauld and Staff  
Logical and physical structures of databases: record structures, transaction processing, access methods. Traditional storage techniques, data-base management systems, relational databases, databases for computer-aided engineering. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)

- 297 **Problems in Engineering Management** (3) Waters and Staff  
Project course providing the opportunity to apply concepts and tools previously studied to the solution of an actual problem in engineering management. Students work in small groups, on a problem proposed by students and approved by the instructor. Open only to master's candidates in the department during the last semester of their program. (Fall, spring, and summer)
- 298 **Research** (arr.) Staff  
Basic or applied research in engineering management or systems analysis. Open to master's degree candidates in the department. May be repeated for credit.
- 299-300 **Thesis Research** (3-3) Staff
- 311 **Marketing of Technology II** (3) Staff  
Special attention to marketing research, negotiation, and international marketing. Required for master's degree candidates in the marketing of technology program. Prerequisite: EMgt 294 or permission of instructor. (Fall, even years)
- 321 **Data Communications and Networks** (3) Donnell and Staff  
Technical and managerial aspects of data communications, with emphasis on technologies for communication networks. Traditional methodologies used in data communications, communication networks, and distributed data processing. Prerequisite: EMgt 254 or permission of instructor. (Fall and spring)
- 344 **Topics in Construction Management** (3) Murphree and Staff  
Current literature in construction management via computer-based, on-line bibliographies. Summary reports with extensive bibliographies are prepared and presented orally in class. Laboratory required. (Fall and spring)
- 370 **Inventive Thought, Cognition, and Computers** (3) Silverman and Staff  
Human information process, memory, and normative vs. descriptive cognitive modeling; designing knowledge-based systems for inventing. Cognitive models of inventors, project managers, and caseworkers are considered; adaptive knowledge-based systems, expert database systems, machine learning systems. Prerequisite: EMgt 270. (Spring, even years)
- 386 **Advanced Topics in Management** (3) Staff  
Reading and discussion of classical and recent literature concerning the philosophy and application of management principles. Total quality management concepts and techniques are covered, as are applications of statistical process control. (Fall, odd years)
- 387 **Technological Forecasting** (3) Staff  
Concepts and methodology: normative and exploratory forecasting, resource allocation and forecasting, technology transfer, technological change and its effects on forecasting, technology assessment. (Spring, even years)
- 388 **Cost Effectiveness** (3) Steiner and Staff  
Advanced problems in engineering economic analysis. Prerequisite: EMgt 261, or equivalent with permission of instructor. (Spring, odd years)
- 390 **Human-Computer Interaction** (3) Papantonopoulos and Staff  
The human factors of interactive computing. Fundamentals of cognitive psychology, linguistics, computer science, and management science applied to the design and development of interactive computer systems: user modeling, requirements analysis, human-computer interface design, new systems implementation. (Spring)
- 394 **Advanced Study** (arr.) Staff  
Limited to professional degree candidates in the department. May be repeated for credit.
- 395-96 **Professional Project Research** (3-3) Staff  
Limited to professional degree candidates in the department.
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to Doctor of Science candidates. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## ENGINEERING SCIENCE

See Civil, Mechanical, and Environmental Engineering.



## ENGLISH

Professors R.N. Ganz, Jr., J.H. Maddox, G. Paster, J.A.A. Plotz (Chair), J.A. Quitslund, C.W. Sten, D. McAleavey, C. Tate, O.A. Seavey, L.B. Salamon

Associate Professors R.L. Combs, G. Carter, A. Romines, K. Moreland, M.S. Soltan, D. Moshenberg, M. Alcorn

Assistant Professors M.V. Dow, C. Sponsler, T. Wallace, P. Cook, J.M. Green, A.C. Pao, P. Chu

*Master of Arts in the field of American literature or Master of Arts in the field of English literature*—Prerequisite: a Bachelor of Arts degree with an undergraduate major in English or American literature, or 24 credit hours in English or American literature above the sophomore level.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including (1) 24 credit hours of course work planned in consultation with the department advisor; (2) Level One proficiency (translation of a passage with a dictionary) in an approved foreign language (French, German, Italian, Spanish, Greek, or Latin); (3) a Master's Comprehensive Examination in American or English literature; and (4) either a master's thesis (6 credit hours) on an approved topic, directed by a member of the department's graduate faculty, or, with the approval of the department's director of graduate studies, 12 additional credit hours of course work in lieu of the thesis. Students must maintain a grade-point average of at least 3.25.

*Doctor of Philosophy in the field of American literature or Doctor of Philosophy in the field of English literature*—Prerequisite: a Bachelor of Arts degree with an undergraduate major in English or American literature, or 24 credit hours in English or American literature above the sophomore level.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including satisfactory completion of (1) 72 credit hours of course work (48 for students with M.A. degrees in English) planned in consultation with the department advisor; (2) Level Two proficiency (translation of a passage without a dictionary) in an approved foreign language, or Level One proficiency (translation with a dictionary) in two approved foreign languages (French, German, Italian, Spanish, Greek, or Latin); (3) a qualifying examination in American literature or English literature (to be taken as soon as feasible within the student's first 24 hours of course work) and a period or genre examination in the intended field of the dissertation; (4) a dissertation on an approved topic, directed by a member of the department's graduate faculty and approved by an examining committee.

Each student plans a program of studies in consultation with the department advisor and a committee of the graduate faculty. Students must maintain a grade-point average of at least 3.25. The fields for the period examination are English Medieval: beginnings to 1500; English Renaissance: 1500–1660; English 18th Century: 1660–1800; Early American: beginnings to 1815; 19th-Century English and or American: 1800–1900; and 20th-Century English and/or American: 1900 to the present. The fields for the genre examination are drama, prose fiction, poetry, and criticism.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

**201 Modern Theory of Rhetoric (3)**

Dow, Alcorn

The rediscovery of rhetoric in 20th-century criticism and pedagogy. Rhetorical orientations toward language; cultural and intellectual contradictions that shape the practice of contemporary rhetoric; theories and methods of teaching composition. (Fall)

**202 The History of Rhetoric (3)**

Dow

Formative theories of discourse developed during the Greco-Roman period and disseminated during the Renaissance and early modern period. The political and philosophical context in which rhetoric was developed in fifth-century Athens. Later Roman and European codifications. (Spring)

**212 Studies in Chaucer (3)**

Sponsler

A view of Chaucer's works as responding to pressing epistemological, social, and moral crises of the late medieval period and, at the same time, as presenting readers with seemingly irresolvable problems of interpretation.

- 219 **Introduction to Graduate Studies in English** (3) Staff  
For all candidates for M.A. and Ph.D. degrees in American or English literature. Introduction to the scope and methods of advanced literary studies; readings, research problems, and instruction designed to acquaint students with available aids to research. (Fall)
- 223 **Contemporary Literary Theory** (3) Carter, Soltan, Sponsler, Napier  
Inquiry into the nature of literary texts and interpretive strategies. Close readings of texts (by Barthes, Derrida, de Man, Bloom, Eagleton, Fish, Kermode, and others) exemplifying the ferment of recent theoretical writing about literature.
- 226 **Studies in Renaissance Verse and Prose** (3) Quitslund  
Investigation of broad topics central to literature of the Renaissance (e.g., development of the lyric, heroic poetry and romance, literature and the court), with primary attention to English texts and some attention to classical and continental contexts.
- 227-28 **Studies in Shakespeare and his Contemporaries** (3-3) Paster, Cook  
Specialized studies of Elizabethan and Jacobean drama, considered in its cultural context, with emphasis on Shakespeare.
- 230 **Studies in Milton** (3) Cook  
(Fall)
- 232 **Studies in English Literature, 1660-1780** (3) Wallace, Maddox
- 233-34 **Studies in the Romantic Movement** (3-3) Plotz, Combs, Wallace  
Intensive and contextual consideration of English Romantic writers, themes, genres. Topics will vary: e.g., Byron and Romantic irony, Wordsworth and Keats, defining Romanticism, Romanticism and childhood.
- 235 **Studies in Victorian Poetry** (3) Carter  
Investigation of various ways in which the major Victorian poets depended upon and departed from the achievements of precursors among the Romantics and earlier poets.
- 236 **Studies in Victorian Prose** (3) Carter  
Study of seminal writings by such authors as Carlyle, Mill, Arnold, Newman, Darwin, and Pater, with attention to both their intrinsic merit and the light they throw on Victorian poetry and fiction.
- 237-38 **Studies in 20th-Century Literature** (3-3) Soltan, Chu
- 251 **Women, Literature, and the Arts** (3) Romines, Tate  
Same as WStu 251.
- 253-54 **Seminar: The English Novel** (3-3) Green  
Investigation of various topics concerning the development of the genre, 18th to 20th centuries: e.g., themes and form in 18th-century fiction; emergence of circumstantial realism; the revolution in fictional forms circa 1900.
- 263-64 **Seminar: American Poetry** (3-3) Moshenberg  
American poets and critics of poetry.
- 267-68 **Seminar: American Fiction** (3-3) Sten, Tate, Moreland  
Investigation of various topics pertinent to the American novel and short fiction, primarily of the 20th century (e.g., Faulkner, experimental fiction, writers of the Midwest).
- 273 **Studies in Early American Culture** (3) Seavey  
The interrelation of American literature and culture, 1607-1820. Literary texts, historiography, and religious issues. Same as AmCv/Hist 273.
- 283-84 **Seminar: American Romanticism** (3-3) Sten  
Engl 283: American Romance writers: Melville, Hawthorne, Poe, and others.  
Engl 284: American Transcendentalist poetry: Emerson, Whitman, Dickinson, and others.
- 285-86 **Seminar: American Realism, 1865-1915** (3-3) Romines  
Realistic fiction in various contexts—literary, intellectual, cultural. Major authors, such as James, Twain, Howells, and Wharton, are included, along with other writers, such as Jewett, Chopin, Norris, and Adams. Topics vary: e.g., the autobiographical impulse, influence of French fiction and criticism, the importance of "place," the significance of gender.
- 287 **O'Neill and Modern American Drama** (3) Combs  
Study of the career of Eugene O'Neill and his impact on the development of modern theater in America; readings in biography and criticism. (Fall)



- 295 **Independent Research** (3) Staff  
 Written permission of instructor required. May be repeated for credit to a maximum of 9 hours.
- 299–300 **Thesis Research** (3–3) Staff  
 301–14 **Folger Institute Seminars** (3 each) Staff  
 Topics will be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. Consult the graduate advisor before registration.
- 398 **Advanced Reading and Research** (arr.) Staff  
 Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
 Limited to Doctor of Philosophy candidates. May be repeated for credit.

## ENVIRONMENTAL AND RESOURCE POLICY

### Committee on Environmental and Resource Policy

H. Merchant (Director), H. Vandermer, A. Viterito

Columbian College and Graduate School of Arts and Sciences offers an interdisciplinary program leading to the degree of Master of Arts in the field of public policy with a concentration in environmental and resource policy. The program is directed by the Committee on Environmental and Resource Policy and draws upon faculty and relevant courses from the various departments within the University.

The Environmental and Resource Policy Program presents in its core requirement a graduate-level examination of the specific areas that affect decisions made in the broad area of environmental and resource policy. This material includes the analytic tools required for decisions leading to effective policy regarding the environment and natural resources. In addition to mastering the core material, a student is also expected to develop specific competence in an area of particular interest by choosing an approved elective field. Prospective candidates should consult with the director of the Environmental and Resource Policy Program.

*Master of Arts in the field of public policy with a concentration in environmental and resource policy*—Prerequisite: a bachelor's degree with a B average (or equivalent) in a social science, natural science, or other relevant area from an accredited college or university and an introductory course in statistics.

#### Required:

(a) The general requirements stated under Columbian College and Graduate School of Arts and Sciences.

(b) Twenty-six hours of core courses selected from the following (students whose backgrounds include some of these courses may substitute additional courses in the elective field): BiSc 208, 243; Econ 217, 237; EnHe 240; E&RP 210; PSc 203; PAd 205; Stat 183 (or other appropriate statistical techniques course).

(c) Twelve hours of courses selected from those listed in one of the following elective fields. Check the Undergraduate Programs Bulletin for 100-level courses.

Earth Sciences: Geog 107, 108, 136, 137, 219, 220; Geol 105, 122, 128, 274

Ecology: BiSc 126, 154, 155, 156, 157, 167 or 168, or 169, 242; Geog: 220, 290, 291

Energy: EMgt 221, 222; Geog 134; IAff 222; PSc 223, 224 (the School of Engineering and Applied Science offers many courses relevant to this area; some may be included in this program)

Resource Management: Econ 161, 162; Geog 132, 133, 222, 230, 290, 291

(d) Comprehensive Project—Undertaken at the completion of the student's program, the comprehensive project is the investigation of a specific problem in environmental and resource policy and the development of a proposed solution in a manner that integrates the core curriculum with the course work in the elective field.

### 210 Seminar in Environmental and Resource Policy (3)

Merchant

Approaches to environmental decision making as related to the formation of environmental and resource policy. Emphasis on the development of a practical model to be used in the evaluation and incorporation of disparate information relevant to an environmental issue. Serves as preparation for the comprehensive project. Limited to degree candidates in the program or enrollment with permission of the instructor.

## ENVIRONMENTAL SCIENCE

The master's program in environmental science has been discontinued. The courses that follow are offered to currently enrolled degree candidates.

## ENVIRONMENTAL HEALTH

- 201 Introduction to Epidemiology (3)** Vandermer  
Principles and methodology of epidemiology and biostatistics. Ecological approach to health and disease, including parasitology and mycology.
- 240 Environmental Impact Statement Procedures and Environmental Law (3)** McGuirl  
The rationale for environmental impact statements from the viewpoint of the nature and origins of environmental concerns. Government agencies responsible for environmental impact statements; current statutes and regulations pertaining to the environment.
- 256 Introduction to Environmental Health (3)** Vandermer  
Organizations, functions, current practices, and regulations at all levels to control the environment. Economic impact upon society and industry in carrying out control and preventive practices.
- 270 Industrial Hygiene (3)** Staff  
Industrial health hazards: chemical exposure to toxic dusts, metallic fumes and vapors, gases, and organic compounds; physical hazards such as high- and low-temperature biological effects, radiation (electromagnetic, ultraviolet, ionizing), illumination, sound, pressure, and particulate pollution; prevention and control of industrial health hazards.
- 301 Applied Epidemiology and Environmental Health (3)** Aavedal, Thomas  
Lectures, seminars, and case studies. Epidemiological solutions to health problems of the community.

## EUROPEAN STUDIES

**Program Committee:** M.J. Sodaro (*Director*), H.B. Feigenbaum, C.J. Herber, G.P. Lauter, M.O. Moore, S.L. Wolchik.

*Master of Arts in the field of European studies*—The Elliott School of International Affairs offers a multidisciplinary program that provides a broad background in the history and politics of Western and Eastern Europe as well as analytical tools for understanding the domestic and international dynamics of contemporary Europe. The program is to provide skill-based professional training for those interested in government, business, and related careers in European affairs as well as strong academic preparation for those planning further study.

**Prerequisite:** The admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. In addition, degree candidates must satisfactorily pass a statistics course at the level of Stat 51, 53, or 111 with a grade of B or better. The course may be taken either before or after entering the program; it will not count as credit toward the degree.

**Required:** the general requirements stated under the Elliott School of International Affairs. The program consists of 36 hours of course work. All students must take four courses in the required major field of European history and politics. Any four courses may be chosen from among the following, but no more than two courses in either Group B or C may be taken in fulfillment of the major field requirement. Group A: Hist 241, 249; Group B: PSc 260, 261, 262; Group C: Hist 205, 206, 297; Group D: PSc 264, 265. Group E: PSc 230, 231.

All students must take a minor field in economics and international business, consisting of Econ 217–18, 283 and 284. Econ 217–18 may be waived on the basis of satisfactory completion of equivalent course work; if either or both courses are waived, students must take Econ 283 and 284 plus an additional course in economics or international business to complete the minor field. Comprehensive examinations must be passed in both the major and minor fields.

Iaff 295 is required of all students and should be taken in the fall semester of the second year. The remaining courses in fulfillment of the program are focused electives that may be chosen from among the courses listed below. Courses other than those listed below may be elected with the approval of the director of the European Studies Program. With the



director's approval, students may elect IAff 298, consisting of an independent research project directed by a faculty member. Students may take no more than 21 credits in any one discipline.

Degree candidates must pass a language examination demonstrating proficiency beyond the second year of study (ILR R3 in Russian or an appropriate East-Central European language, or the equivalent in a West European language). This examination must be taken before students apply to take comprehensive examinations. Students who plan to pass the examination in one language and wish to study a second language while in the program may do so. Three credits of language study may be counted toward the degree.

The following courses pertain to European Studies.

- Econ 217-18 *Survey of Economics*
- Econ 251 *Development Economics I*
- Econ 267 *Economies of the Former Soviet Union and Eastern Europe*
- Econ 268 *Economies of the Former Soviet Union and Eastern Europe in Transition*
- Econ 283 *Survey of International Trade Theory and Policy*
- Econ 284 *Survey of International Macroeconomics and Finance Theory and Policy*
- Hist 205 *Readings Seminar: Eastern European History, 1772-1918*
- Hist 206 *Readings Seminar: Eastern European History, 1919-1945*
- Hist 241 *Readings/Research Seminars: Modern European History*
- Hist 249 *Research Seminar: European Diplomatic History*
- IAff 223 *Science, Technology, and International Affairs*
- IAff 254 *Defense Policy and Program Analysis II*
- IAff 292 *Colloquium: Russia and Eastern Europe*
- IAff 295 *Colloquium: Europe*
- IBus 260 *The New Global Competitive Framework*
- IBus 261 *Multinational Corporations in the World Economy*
- IBus 271 *International Business Finance*
- IBus 278 *International Business Negotiations*
- PSc 161 *European-Atlantic Relations*
- PSc 207 *Modern Political Thought and Ideologies*
- PSc 230 *Comparative Government and Politics I*
- PSc 231 *Comparative Government and Politics II*
- PSc 232 *Communism and Democratization*
- PSc 243 *Problems in International Organizations II*
- PSc 257 *Arms Control and Disarmament*
- PSc 260 *Western European Politics*
- PSc 261 *Politics of the European Community*
- PSc 262 *The Political Economy of Western Europe*
- PSc 263 *Russia and Europe*
- PSc 264 *Governments and Politics of Eastern Europe*
- PSc 265 *The International Politics of Eastern Europe*
- PSc 268 *Post-Soviet Foreign Policies*
- PSc 269 *Post-Soviet Military Policies*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

#### EXERCISE SCIENCE AND TOURISM STUDIES

Professors D.E. Hawkins, D.C. Paup (Chair)  
 Adjunct Professors C.A. Troester, Jr., R. Anzola-Bentancourt, D.L. Edgell  
 Associate Professor B. Fernhall  
 Adjunct Associate Professor D. Frechtling  
 Assistant Professors L.A. Delpy, E.C. Rach, P.A. Sullivan  
 Instructor S.E. Spivack  
 Adjunct Instructors S.D. Cook, S.A. Schulman, B. Dwyer

See the School of Education and Human Development for programs of study leading to the degree of Master of Arts in Education and Human Development (with specialization in exercise science and in tourism administration).

## EXERCISE SCIENCE

- 201 **Experimental Course** (3) Staff  
Topic to be announced in *Schedule of Classes*.
- 255 **Fitness Evaluation and Exercise Prescription** (3) Fernhall  
Methods and techniques for providing individualized exercise and fitness prescriptions based on measurement and evaluation of physical fitness and health-related variables. Prerequisite: ExSc 152 or permission of instructor. Laboratory fee, \$40. (Spring)
- 256 **Sports Medicine** (3) Paup  
Theory, practice, and research in diagnostic treatment, rehabilitation, and prevention of sports-related injuries. Prerequisite: ExSc 150.
- 257 **Principles and Concepts of Employee Health/Fitness Programs** (3) Delpy  
General overview of the employee health fitness movement in the U.S. and other countries. Public and private health policy implications will be analyzed together with national economic and political trends relating to the subject. Evaluation of model programs, procedures, and current practice.
- 259 **Exercise, Stress, and Cardiac Rehabilitation** (3) Gorman  
Applied physiology of exercise and psychological stress in relation to coronary artery disease and myocardial infarction; the principles and practice of rehabilitation of patients recovering from a coronary event (heart attack or heart surgery) by exercise therapy and risk-factor reduction. Prerequisite: ExSc 152 or permission of instructor. (Fall)
- 280 **Advanced Workshop** (1 to 3) Staff  
Topic to be announced in *Schedule of Classes*. Contemporary issues and problems; development of advanced professional competencies. May be repeated for credit with permission of advisor. (Fall and spring)
- 282 **International Experiences** (1 to 6) Delpy  
For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor.
- 283 **Practicum** (3 to 6) Staff  
For master's degree candidates enrolled in the department. Fieldwork, internship, and/or instructional practice, including conference and or seminar. May be repeated once for credit with permission of advisor. (Fall, spring, and summer)
- 290 **Advanced Seminar** (1 to 3) Staff  
Topic to be announced in *Schedule of Classes*. May be repeated for credit with approval of advisor. (Fall and spring)
- 293 **Independent Study** (1 to 6) Staff  
For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor.
- 297 **Advanced Topical Studies** (3) Staff  
For master's degree candidates enrolled in the department. Independent research and study pertinent to the needs of the student. Prerequisite: Educ 295 or permission of instructor. (Fall and spring)
- 299 **Thesis Research** (6) Staff

## TOURISM STUDIES

- 201 **Experimental Course** (3) Staff  
Topics announced in the *Schedule of Classes*. (Fall, spring, and summer)
- 230 **Organization and Management of Airlines** (3) Dwyer  
Overview of domestic and international passenger air transportation systems. Analysis of planning, financing, operating, marketing, and evaluating airline transportation systems. Legal and regulatory aspects of airline operation. Attention is devoted to development of infrastructure and related support services. (Spring and summer)
- 249 **Economic, Sociocultural, and Environmental Aspects of Tourism** (3) Spivack  
Impact of tourism on economic development and cultural values; specific emphasis on psychosocial, physical, and community impacts. (Fall and summer)



- 250 Administration of Travel and Tourism Services (3)** Frechtling  
Organization and management concepts, theories, and issues, stressing application of theory through analysis of short case examples drawn from the broader range of the travel and tourism industry. (Fall and summer)
- 260 Tourism Development (3)** Staff  
Relationship of economic theory and principles to tourism development; applications of financial analysis techniques to the travel and tourism field. (Spring)
- 261 Planning for Tourism (3)** Anzola-Betancourt  
Integrated planning for travel and tourism organizations; financial and physical development for comprehensive tourism projects; consideration of basic concepts, approaches, and models. (Spring and summer)
- 262 Tourism Policy Analysis (3)** Edgell  
Understanding components of tourism policy, development of tools for tourism policy analysis, and description of tourism organizations in the government and private sector. (Spring and summer)
- 263 Tourism Marketing (3)** Frechtling  
Concepts and techniques employed in marketing travel industry products and services, including its public- and private-sector components. Assessment of the tourism product, development of the marketing strategy, preparation of the marketing plan, and analysis of specific promotional programs. (Fall)
- 270 Travel and Tourism Research (3)** Frechtling  
Analysis of general research methods and tools and their application to the study of travel and tourism. (Spring and summer)
- 280 Advanced Workshop (1 to 6)** Staff  
Workshops with emphasis on contemporary issues and problems; development of advanced professional competencies. May be repeated for credit with permission of advisor. (Fall, spring, and summer)
- 282 International Experiences (1 to 12)** Staff  
For master's degree candidates enrolled in the department. Travel to a foreign country for study of a specific topic. May be repeated for credit with approval of advisor. (Fall, spring, and summer)
- 283 Practicum (3 to 6)** Staff  
For master's degree candidates enrolled in the department. Fieldwork, internship, and/or instructional practice, including conference and/or seminar. May be repeated once for credit with permission of advisor. (Fall, spring, and summer)
- 290 Advanced Seminar (1 to 3)** Hawkins  
For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor. (Fall, spring, and summer)
- 293 Independent Study (1 to 6)** Staff  
For master's degree candidates enrolled in the department. May be repeated for credit with approval of advisor. (Fall, spring, and summer)
- 296 Systems Analysis of Tourism Services (3)** Staff  
Quantitative analysis, resource identification, design techniques, and other systems approaches applied to travel and tourism services. (Fall and summer)
- 297 Advanced Topical Studies (3)** Staff  
For master's degree candidates enrolled in the department. Research and study pertinent to the selected topic. Prerequisite: Educ 295 and TrSt 270 or permission of instructor. (Fall, spring, and summer)
- 299 Thesis Research (1 to 6)** Staff  
Individual research under guidance of a staff member. May be repeated for credit with approval of advisor. Prerequisite: Educ 295 and TrSt 270 or permission of instructor.

## FINANCE

Professors F. Amling, T.M. Barnhill (Chair), W.E. Seale, W. Handorf  
 Professorial Lecturer T. Curry  
 Associate Professors J.M. Sachlis, N.G. Cohen, P.S. Payser, M.S. Klock  
 Associate Professorial Lecturer R. Strand

Assistant Professors S.K. Bryant, G.M. Jabbour, M. Humber (Visiting)  
 Assistant Professorial Lecturer R. Petruska

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Accountancy, Master of Business Administration, and Doctor of Philosophy.

**Note:** All courses pertaining to real estate development are in process of change as this bulletin is prepared for press. Please check with the Finance Department for information on Fina 225, 226, 227, and 228.

- 220 Business Financial Management (3)** Klock, Jabbour, Handorf, Seale, Bryant  
 This course is a First-Level requirement for M.B.A. students; it may not be used to satisfy a Second-Level requirement. Theory, policy, and practice in financial management; financial analysis, sources of funds, investing, capital budgeting and structure, risk analysis, cost of capital and dividend policy. Prerequisite: Accy 201, Econ 217, Mgt 218 and 270. (Fall and spring)
- 221 Financial Decision Making (3)** Sachlis, Peyser, Klock  
 Theory and practice of business finance, emphasizing the impacts of long- and short-term uses and sources of funds on the firm's value. Prerequisite: Fina 120 or 220. (Fall and spring)
- 222 Capital Formation (3)** Bryant, Handorf  
 Determinants of saving and investment and resultant funds flow are evaluated. Special emphasis on the level and risk structure and term structure of interest rates. The role and management of financial institutions is stressed. Prerequisite: Fina 120 or 220. (Fall and spring)
- 223 Investment Analysis and Portfolio Management (3)** Amling, Cohen, Klock  
 Risk-reward analysis of security investments, including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: Fina 120 or 220. (Fall and spring)
- 224 Financial Management (3)** Barnhill, Cohen  
 Advanced case studies in financial management; working capital policy, capital budgeting, financing with debt and equity, dividend policy, and valuation. Prerequisite: Fina 221. (Fall and spring)
- 225 Economic, Social, and Legal Aspects of Real Estate Development (3)** Staff
- 226 Financing Real Estate Development (3)** Staff
- 227 Problems in Real Estate Development (3)** Staff
- 228 Real Estate Development Planning and Design (3)** Staff
- 231 Seminar: Investment and Portfolio Management (3)** Amling  
 Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: Fina 223. (Fall)
- 233 Bank Management and Regulation (3)** Handorf, Bryant  
 Consideration of a range of issues faced by bank managers. Financial models are developed to provide an analytical framework to assist decision making in the context of relevant regulatory restraints. Prerequisite: Fina 220 or permission of professor. (Spring)
- 235 Futures Markets: Trading and Hedging (3)** Barnhill, Seale  
 Organization and regulation of futures markets. Alternative strategies for trading of futures contracts for possible hedging uses. High risk-high return investment alternatives. The use of futures markets to manage risks. Prerequisite: Introductory courses in economics, statistics, computer usage, and financial management. (Fall and spring)
- 236 Options (3)** Jabbour  
 Pricing of options on financial instruments. Role of options in risk management, trading strategies, hedging implications for national and international investors, and structure and regulation of option markets. Prerequisite: Fina 220. (Fall and spring)
- 237 Personal Financial Advising (3)** Cohen  
 For students preparing to be personal financial advisors: the combination of taxes, pensions, investing, budgets, estates and trusts, and insurance into comprehensive personal financial plans. Regulation, professional ethics, and the



- economics of advisory firms are also covered. Extensive use of computer spreadsheets and case studies. Prerequisite: Fina 221, 223; Accy 261. (Spring)
- 239 **Financial Theory** (3) Peyser, Klock  
In-depth theoretical analysis of financial topics, including asset management, financial structure, dividend policy, and the capital asset pricing framework. Prerequisite: Fina 221, 223.
- 290 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 298 **Directed Readings and Research** (3) Staff
- 299 **Thesis Seminar** (3) Staff
- 300 **Thesis Research** (3) Staff
- 311 **Seminar: Public-Private Sector Institutions and Relationships** (3) Staff  
Same as SMPP 311.
- 321 **Seminar: Financial Markets Research** (3) Peyser, Klock, Sachlis  
Market efficiency, utility testing, the capital asset pricing model, the arbitrage pricing theory, the option pricing model, and aggregate market volatility. Prerequisite: Fina 239; Mgt 270.
- 322 **Seminar: Corporate Finance Research** (3) Peyser, Klock, Sachlis  
Capital budgeting, capital structure issues, dividend policy, microeconomic foundations, mergers, and agency theory. Prerequisite: Fina 239; Mgt 270.
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to doctoral candidates. May be repeated for credit.

#### FORENSIC SCIENCES

Professors T.P. Perros (Emeritus), J.E. Starrs, T.F. Courtless, Jr., C. O'Rear (Chair), W.F. Rowe  
Adjunct Professor C.G. McWright  
Professorial Lecturers E.G. Howe, K.E. Melson, R.C. Morin  
Associate Professor N.T. Lappas  
Associate Professorial Lecturers W.A. Bayse, S.R. Lorigo, R.E. Easton, G. Epstein, J.M. Carter, S.C. Cogwell, F.N. Hellman, K.B. Reiber, N.K. Shemonsky  
Assistant Professorial Lecturers L. O'Grady, S.W. Bentley, W.E. Clancy, E.L. Lee II, J.T. Martin, R.G. Chesnut, R.V. Ferris, D.A. Pluchinsky, J.F. Larner, A. Gallagher, D.C. Mount

**Master of Forensic Sciences**—Prerequisite: a bachelor's degree from an accredited institution of higher learning and academic or professional experience in the behavioral, biological, or physical sciences or in law, medicine, or law enforcement.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Students must complete 36 credit hours of approved course work; students approved for a thesis must complete 30 credit hours of course work plus a thesis (equivalent to 6 credit hours). ForS 220, 221, 224, and 225 are required of all students. ForS 224 may be waived for students having an LL.B. or J.D. degree from an accredited law school. The following are also required: (1) 9 hours selected from ForS 201, 202, 203, 204, and 205; (2) 9 hours selected from ForS 214, 260, 261, 265, and 269; (3) the remaining credit hours must be selected in consultation with the advisor from the behavioral sciences, law, management science, or forensic sciences. It is strongly recommended that students participate in the forensic sciences practicum. All candidates are required to pass a written Master's Comprehensive Examination.

**Master of Forensic Sciences with a concentration in forensic molecular biology**—Prerequisite: a bachelor's degree in the biological or physical sciences from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of studies consists of 40 credit hours of approved course work. Bioc 221–22, 250; BiSc 229 or ForS 201; BiSc 228, 230, 274, 275; ForS 295, Micr 229, and Stat 127 are required of all students. The remaining required hours are electives chosen in consultation with the advisor. The Bioc 221–22 requirement may be waived if equivalent courses have been taken within the last two years as a part of a graduate degree program. Each student must participate in a departmental seminar in forensic molecular

biology each semester. All candidates are required to pass a written Master's Comprehensive Examination.

*Master of Science in the field of chemical toxicology*—Prerequisite: completion of the first three years of the combined B.S./M.S. program in chemical toxicology (see Chemistry Department) or its equivalent. Courses may be required to remove academic deficiencies.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The following courses are required: Bioc 221–22; Phar 203; ForS 240, 245, and 242 or 270; two courses selected from ForS 246, 248, 249, 269; ForS 299–300 or Chem 299–300. Chem 134, 141–42, and Stat 127 will be required of students who have not had these courses or their equivalent. All candidates are required to pass a Master's Comprehensive Examination.

*Five-Year Bachelor of Science/Master of Science in the field of chemical toxicology*—See the Undergraduate Programs Bulletin.

*Master of Science in Forensic Science*—Prerequisite: a bachelor's degree in the biological or physical sciences from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study consists of 30 credit hours of course work, plus a thesis (equivalent to 6 credit hours). Individualized programs of study will be developed to meet the career objectives of each student. Students may specialize in forensic chemistry, toxicology, or serology. Each such program of study must include ForS 224 and 225. All candidates must also participate in the departmental seminar each semester. The remaining credit hours must be selected from approved courses in the forensic sciences, biological and physical sciences, management science, law, or basic medical sciences. It is strongly recommended that students participate in the forensic sciences practicum. All candidates are required to pass a written Master's Comprehensive Examination.

*Master of Arts in the field of criminal justice*—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study consists of 36 credit hours of approved course work in the forensic sciences, law, criminology, management science, sociology, and psychology. ForS 214, 220, 221, 224, 225, 254, 265, 266, 274, 290, and Soc 259, 261 are recommended. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences practicum.

*Master of Arts in the field of criminal justice with a concentration in crime in commerce*—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study consists of 36 credit hours of approved course work drawing upon the forensic sciences, law, accounting, computer science, investigative techniques, and management. ForS 203, 214, 224, 225, 229, 232, 234, 235, 251, 267, and 274 are recommended. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the forensic sciences practicum.

*Master of Arts in the field of criminal justice with a concentration in security management*—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Students must complete 36 credit hours of approved course work; students approved for a thesis must complete 30 credit hours of course work plus a thesis (equivalent to 6 credit hours). The program of study consists of course work drawing from the forensic sciences, law, criminology, management science, investigative techniques, and security management. Courses are selected from ForS 214, 224, 225, 229, 232, 234, 252, 254, 256, 257, 266, 267, 290, 295; Soc 263. All candidates are required to pass a written Master's Comprehensive Examination. It is strongly recommended that students participate in the security management practicum.

The interdisciplinary programs leading to the degrees of Master of Arts, Master of Forensic Sciences, and Master of Science in Forensic Science may include course work from the School of Business and Public Management, the National Law Center, the School



of Medicine and Health Sciences, and graduate course work in the behavioral, biological, and physical science departments of the University. Students work closely with their advisors in setting up a program that meets their interests, needs, and background knowledge. The Department of Forensic Sciences is affiliated with the Armed Forces Institute of Pathology and with the Council of Higher Education, Commonwealth of Virginia, in programs of mutual exchange of students, courses, and facilities. For further information, contact the Department of Forensic Sciences.

A research field in forensic chemistry is available in the Ph.D. program in the Chemistry Department.

- 201 **Forensic Serology I (3)** Lappas, Rowe  
Principles of the forensic analysis of blood and other biological materials. Specific procedures and techniques used in forensic serology. Laboratory exercises.
- 202 **Instrumental Analysis (3)** Rowe  
Principles and application of various instrumental methods to the examination of criminal evidence, including chromatographic and spectrophotometric techniques and mass spectrometry. Laboratory exercises.
- 203 **Examination of Questioned Documents (3)** Larner, Epstein  
Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture and fiber analysis; studies of paper and methods of examining questioned documents. Laboratory exercises.
- 204 **Firearms and Toolmark Identification (3)** Rowe  
Methods for identifying firearms, cartridge casings, toolmarks, tire marks, and footprints. Laboratory exercises.
- 205 **Personal Identification (3)** O'Rear, Rowe  
Methods of personal identification based on sketches, fingerprints, voiceprints, odontology, and study of skeletal remains.
- 214 **Forensic Psychiatry (3)** Howe, Morin  
Introduction to the constructs of dynamic psychiatry, psychiatric treatment, and the nomenclature of mental disorders. Consideration of expert testimony, direct examination, and cross-examination in hospitalization and criminal cases.
- 220 **Physical Aspects of Forensic Sciences (3)** O'Rear, Rowe  
Survey of forensic physical sciences; fingerprints, firearm and toolmark examinations, document examinations, and examinations of trace evidence, such as glass, soil, paint, hairs, and fibers; crime scene investigations; qualifications and preparation of expert witnesses; operation and functioning of the forensic science laboratory.
- 221 **Biological Aspects of Forensic Sciences (3)** Lappas, Rowe  
Principles of forensic pathology, serology, and toxicology. The role of the forensic laboratory in the identification of human remains; determination of the time, cause, and manner of death; partial individualization of biological materials; and the detection of drugs in biological materials.
- 224 **Criminal Law I (3)** Clancy, Melson, O'Grady  
Principles of criminal law and procedure, preparation and presentation of evidence, examination of witnesses, and methods of legal research.
- 225 **Criminal Law II: Evidence (3)** Martin, Chestnut, Mount  
Procedural rules affecting the collection and use of physical evidence. Emphasis on court opinions defining the rules of search and seizure and admissibility of evidence. Prerequisite: ForS 224.
- 227 **Criminal Law III: Procedure (3)** Melson, O'Grady, Gallagher  
Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, postconviction procedures. Prerequisite: ForS 224.
- 229 **Criminal Law IV: Contracts (3)** Easton  
Concepts and principles of law encountered in commercial activities: contracts, sales, negotiable instruments, and bankruptcy. Emphasis on recognition of deceptive contracting practices. Statutes and government regulation governing contracts.
- 232 **Crime in Commerce I: Accounting (3)** Lorigo  
Principles of accounting; abuse and misuse of accounting procedures; use of accounting in the investigation of commercial crime.

- 233 Crime in Commerce II: Procurement and Supply (3)** Bentley  
Governmental and private-sector procurement procedures; techniques of inventory management; abuse of procurement procedures and illicit diversion of supplies.
- 234 Crime in Commerce III: Information Systems (3)** Bayse  
Principles of management information systems; security of information systems and facilities; compromising of information systems.
- 235 Crime in Commerce IV: Conspiracy (3)** Lorigo  
Legal definition of conspiracy; quantum of proof; use of investigative techniques to establish the existence of criminal conspiracies.
- 240 Principles of Toxicology (4)** Lappas  
Concepts of toxicology, including its historical development and modern applications, drug disposition, mechanisms of toxicity; factors that influence toxicity and toxicity evaluation. Prerequisite: Phar 203 or permission of instructor.
- 242 Chemistry of Organic Medicinal Agents (3)** O'Rear  
A correlated study of the composition, constitution, physical and chemical properties, and pharmaceutical uses of organic medicinal agents. Included are discussions of the heterocyclic chemistry of these agents.
- 245 Analytical Toxicology (4)** Lappas  
A study of qualitative and quantitative principles and procedures used in the detection, identification, isolation, purification, and potency determination of drugs. Laboratory.
- 246 Environmental Toxicology (3)** Lappas  
A study of the chemical substances to which humans are unintentionally exposed. Emphasis will be placed on pesticides, food additives, and air pollutants.
- 248 Clinical Toxicology (3)** Lappas  
A study of the adverse effects caused by or related to the use of drugs. The signs and symptoms, diagnoses, and treatments will be emphasized.
- 249 Industrial Toxicology (3)** Lappas  
A study of the potential hazards encountered by workers as a result of their exposure to raw materials, intermediates, and finished products. The types of exposure and methods of predicting and preventing toxic exposure will be emphasized.
- 250 Interdisciplinary Aspects of Forensic Science (3)** O'Rear  
Scientific and legal aspects of current concepts. Includes qualification as an expert witness, chain of custody, impact of testimony on the jury, admissibility of evidence, class evidence vs. individualized evidence, and search and seizure. Prerequisite: ForS 224.
- 251 Moot Court (3)** Martin, Gallagher  
Students prepare and present direct testimony and are cross-examined by an experienced trial attorney in simulated courtroom setting. Class discussions of problems, techniques. Lectures on discovery, admissibility of scientific evidence, chain of custody, use of notes, etc. Prerequisite: ForS 224.
- 252 Topics in Security Management (3)** Lee  
The broad spectrum of factors that shape modern security management: technology, government regulations and policies, corporate matters, information systems, legal principles, international programs, congressional committees, industrial organizations, associations. Potential areas of research and study.
- 254 Selected Topics (3)** Bentley, Pluchinsky  
Current issues in research, investigation, and law.
- 255 Security Management I (3)** Lee  
Risk assessment and management, redundant security systems, cost-benefit analysis. Administration of personal, industrial, and physical plant security. Analysis of factors that facilitate decision making in security problems.
- 256 Security Management II (3)** Lee  
Hostage situations, preparation of high-risk employees and spouses for hostage incidents, management of post-incident situations, hostage rescue groups.
- 257 Management of Security Organizations (3)** O'Rear  
Theories of management, with emphasis on leadership and interaction of individuals, groups, managers, and the organization as a whole. Discussions centered on organizations with security responsibilities, including government agencies, corporate entities, and the military.



- 260 Principles of Forensic Medicine (3)** Hellman  
Anatomy and physiology of the human body, with emphasis on understanding the processes underlying traumatic and unexpected deaths encountered in forensic pathology. Bone growth and repair as it relates to child abuse, structure and functions of the heart as related to sudden death, and anatomic area of the brain prone to hemorrhagic lesions following trauma.
- 261 Principles of Forensic Pathology (3)** Hellman  
Terminology and scientific techniques used in medico-legal investigations, sudden or unexpected deaths, homicides, suicides, accidental deaths, and trauma.
- 265 Drugs of Abuse (3)** Lappas, O'Rear  
Chemical, pharmacological, toxicological, and pathological characteristics of commonly abused drugs, including ethanol, barbiturates, narcotics, stimulants, and hallucinogens. Primarily for M.A. degree candidates; open to others with permission of instructor.
- 266 Seminar: Modern Trends in Criminal Justice (3)** O'Rear, Courtless  
Recent advances in criminal justice. Discussions incorporate several disciplines, including science, law, management, social sciences, and psychology.
- 267 Seminar: Crime in Commerce (3)** Lorigo  
Interdisciplinary course in current problems in the investigation and prosecution of commercial offenses.
- 268 Photography in the Forensic Sciences (3)** Ferris  
Basic use of forensic photography, including selection and use of equipment, photographs as evidence, close-up work, and common misconceptions. Laboratory fee, \$35.
- 269 Forensic Toxicology I (3)** Lappas  
Relevant underlying biological, chemical, and pharmacological principles of forensic toxicology.
- 270 Medicinal Chemistry (3)** O'Rear  
Theory and principles of classification, synthesis, and structure activity relationships of drugs. Discussion of the complex chemical events that take place between administration of a drug and its action on the user, with emphasis on drugs of abuse.
- 271 Forensic Serology II (3)** Lappas  
Methods in forensic serology. Laboratory examinations and classifications of dried blood and other biological materials. Independent laboratory projects. Laboratory fee, \$35. Prerequisite: ForS 201 or permission of instructor.
- 272 Forensic Toxicology II (3)** Lappas  
Lectures, student seminars, laboratory exercises, and projects dealing with topics of current interest in forensic toxicology. Prerequisite: ForS 245 or 269 or permission of instructor. Laboratory fee, \$35.
- 273 Forensic Chemistry I (3)** Rowe  
Examination of glass, soils, hairs, and fibers. Laboratory exercises include refractive index measurements using immersion methods; polarized light observations of minerals; x-ray diffraction analysis of minerals; and classical chemical and physical methods of analysis. Prerequisite: ForS 202 or permission of instructor. Laboratory fee, \$35.
- 274 Management of Criminal Justice Organizations (3)** O'Rear  
Theories of management with emphasis on leadership. Interaction of individuals, groups, managers, and the organization as a whole. Discussions center on the criminal justice system.
- 280 Forensic Chemistry II (3)** Rowe  
Examination of arson accelerants, textile fibers, plastics, and paints. Laboratory exercises include infrared spectrophotometry and pyrolysis—gas—liquid chromatography of polymeric materials, as well as classical chemical and physical methods of analysis. Prerequisite: ForS 273. Laboratory fee, \$35.
- 290 Research in Criminal Justice (3)** Courtless  
An examination of the role and process of research as it serves the criminal justice system. Presentations and discussions of the literature with emphasis on the use of research and analysis in formulating and evaluating criminal justice policy.
- 295 Research (arr.)** Staff  
Open to qualified master's degree students. Research on problems approved by the department chairman or academic advisor, under the supervision of an appropriate staff member.

**297 Security Management Practicum (1)**

O'Rear

Open to qualified master's degree students. Internship experience in an agency or corporate unit with security responsibilities, under the supervision of an appropriate staff member. Students must preregister for the course. Credit for the course cannot be used toward the 36 credit hours required for the master's degree.

**298 Forensic Sciences Practicum (1)**

O'Rear

Open to qualified master's degree students. Internship experience in a forensic science laboratory or criminal justice agency, under the supervision of an appropriate staff member. Students must preregister for this course. Credit for the course cannot be used toward the 36 credit hours required for the master's degree.

**299-300 Thesis Research (3-3)**

Staff

**GENETICS****Committee on Genetics**

S.O. Schiff (*Director*), S.L. Adhya, V.M. Barnabei, J. Battey, J. Brady, K.M. Brown, D.J. Brusick, P.N. Bryan, J. Chou, N.H. Colburn, R.F. De Giovanni-Donnelly, D.D. Derse, W. Drohan, R.C. Gallo, C.T. Garrett, G.L. Gilliland, D. Goldman, G. Hager, T.T. Hla, B.H. Howard, L.W. Hoyer, V.W. Hu, D.E. Johnson, K.A. Kennedy, R.L. Kincaid, P.D. Kind, A. Kruisbeek, A. Kumar, J.W. Larsen, P. Latham, W.M. Leach, R. Mage, K.H. McKenney, C.R. Merrill, T.W. Moody, D. Morris, P. Noguchi, S. O'Brien, S. Patierno, M.H. Polymeropoulos, U.R. Rapp, K.N. Rosenbaum, B. Safer, J. Schlom, W.C. Wallace, E.A. Zimmer

Columbian College and Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of genetics. This program is directed by a committee whose members are drawn from the Departments of Biochemistry, Biological Sciences, Microbiology, Obstetrics and Gynecology, Pathology, and Pharmacology and from government agencies and private industry.

Requirements for admission are stated under Columbian College and Graduate School of Arts and Sciences. The undergraduate program must have included the following: 8 credit hours each in biology, inorganic chemistry, and organic chemistry; 6 credit hours in physics; 6 credit hours in English composition and literature; one course in at least two of the following areas: genetics, cell biochemistry, cell or molecular biology.

**Master of Science in the field of genetics**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The 30 credit hours required in this program must include Gnet 201 and Gnet 299-300. The remaining 22 credit hours of course work are to be selected, with the approval of the Committee on Genetics, from the departmental courses listed below.

**Doctor of Philosophy in the field of genetics**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study must include Gnet 301, 8-10 credit hours of biochemistry, 6-8 credit hours of cell biology, 10-12 credit hours of genetics, and 3 credit hours of statistics. These courses may be selected from the departmental listings below. (Course descriptions are listed under the department concerned, except for 100-level courses, which are listed in the Undergraduate Programs Bulletin.)

**201 Advanced Problems in Genetics (2)**

Staff

Lectures on selected topics by members of the Committee on Genetics. Required of all master's degree candidates in the Genetics Program. Prerequisite: degree candidacy or permission of program director. (Fall)

**256 Molecular Genetics of Inherited Diseases (2)**

Sargent

Biochemical aspects of genetics and contributions of molecular biology to understanding of human mutations and hereditary diseases. Prerequisite: degree candidacy or permission of program director. (Spring)

**260 Molecular Genetics of Proteins (3)**

Burgess

Laboratory techniques in gel electrophoresis and electroelution, high pressure liquid chromatography protein blotting, proteolytic and chemical cleavage of proteins, amino acid analysis, automated Edman degradations, peptide synthesis and computer-assisted analysis of protein structure. (Fall, even years)

**295 Research (arr.)**

Staff

Open to qualified master's degree students. Research on problems approved by the Committee on Genetics. May be repeated for credit. (Fall and spring)



**299-300 Thesis Research (3-3)**

Staff

**301 Advanced Problems in Genetics (2)**

Staff

Lectures on selected topics by members of the Committee on Genetics. Required of all Ph.D. candidates in the Genetics Program. Limited to students enrolled in the Genetics Program unless special permission is obtained from the director. (Fall)

**398 Advanced Reading and Research (arr.)**

Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Limited to Doctor of Philosophy candidates. May be repeated for credit.

**Bioc 221-22 General Biochemistry****Bioc 223 Physical Biochemistry****Bioc 234 Structure and Function of Proteins and Enzymes****Bioc 250 Molecular Biology****Bioc 251 Advanced Topics in Molecular Biology****Bioc 252 Biochemical and Molecular Aspects of Selected Diseases****Bioc 266 Cellular Biology****BiSc 102 Cell Biology****BiSc 103 Cell Biochemistry****BiSc 104 Cell Biochemistry Laboratory****BiSc 107 Genetics****BiSc 108 Genetics Laboratory****BiSc 109 Advanced Genetics****BiSc 114 Principles of Development****BiSc 115 Experimental Developmental Biology****BiSc 126 Radiation Biology****BiSc 137 Introductory Microbiology****BiSc 220 Seminar: Cell or Plant Biochemistry****BiSc 227 Seminar: Genetics****BiSc 228 Population Genetics****BiSc 229 Cytogenetics****BiSc 230 Human Genetics****BiSc 249 Seminar: Developmental Biology****BiSc 272 Electron Microscopy****BiSc 274 Gene Regulation and Genetic Engineering****BiSc 275 Introduction to Recombinant DNA Techniques****Micr 229 Immunology****Micr 233 Virology****Micr 258 Microbial Genetics****Micr 260 Cellular Immunology****Phar 203 Fundamental Principles of Pharmacology****Phar 220 Molecular Events in Toxic Actions****Phar 242 Molecular Carcinogenesis****Stat 127 Statistics for the Biological Sciences****Stat 129 Introduction to Computing****GEOBIOLOGY****Committee on Geobiology**

A. Brooks (Acting Chair), M.A. Buzas, R.E. Knowlton, D.L. Lipscomb, H. Merchant, L. Osterman, A. Viterito

Columbian College and Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of geobiology. The program is directed by a committee whose members are drawn from the Departments of Anthropology, Biological Sciences, Geography and Regional Science, and Geology. It is enhanced by cooperative relationships with the Smithsonian Institution and the U.S. Geological Survey. Students may elect to specialize in paleoanthropology within the general program framework of evolutionary biology, paleoecology, and paleontology.

A bachelor's degree in anthropology, biology, botany, geography, geology, or zoology from this University, or an equivalent degree from another accredited institution of higher

learning, is required for admission to the program. Prerequisite: course work in invertebrate zoology or comparative vertebrate anatomy or human anatomy, organic evolution or hominid evolution, general ecology, historical geology, invertebrate or vertebrate paleontology or primatology, statistical methods, and genetics. GW courses that correspond to these prerequisites are, respectively, BiSc 130 or 132 or Anth 146, BiSc 150 or Anth 147, BiSc 154, Geol 2, Geol 151 or 154 or Anth 148, Stat 91, and BiSc 107.

*Master of Science in the field of geobiology*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program includes 30 credit hours of course work, plus a thesis (equivalent to 6 credit hours). Required courses include BiSc 210, Geol 254 and 255, and two field courses in different disciplines. Electives are selected in consultation with the committee from a list of relevant courses in anatomy, anthropology, biological sciences, geology, and geography. Listings of courses at the 100 level are to be found in the Undergraduate Programs Bulletin.

*Doctor of Philosophy in the field of geobiology*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program includes 48 credit hours of course work, plus a dissertation (equivalent to 24 credit hours). Required courses include: BiSc 208 and 210; Geol 254, 255, and 263; and two field courses in different disciplines. Electives are to be selected as for the master's degree (to total, with the required courses, at least 48 credit hours).

*Research fields:* Any subdiscipline of anthropology, biology, geography, or geology that pertains to research in ecology and evolution.

**295 Research (arr.)**

Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit.

**299–300 Thesis Research (3–3)**

**398 Advanced Reading and Research (arr.)**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Limited to Doctor of Philosophy candidates. May be repeated for credit.

## GEOGRAPHY AND REGIONAL SCIENCE

*Professors* J.C. Lowe, D.E. Vermeer (Chair)

*Professorial Lecturers* E. Marasciulo, J. Banister, M.J. Sagers

*Associate Professorial Lecturers* J.A. Zinn, S.E.S. Mastran, W.B. Wood

*Assistant Professors* A. Viterito, M.W. Lewis, D.M. Hart, M.D. Price

*Master of Arts in the field of geography*—Prerequisite: a bachelor's degree with a major in geography or in a related field in the social or natural sciences.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Course work must include Geog 105 (*Techniques of Spatial Analysis*) and 250.

Thesis and nonthesis options are available: The thesis option requires a minimum of 30 credit hours of course work, including Thesis Research; the nonthesis option requires completion of 36 credit hours of graduate work. All degree candidates must take a Master's Comprehensive Examination that covers the substance of academic work pursued under the program of study.

Students entering the program without a bachelor's degree with a major in geography will be required to take prerequisite courses as determined by the department. All entering students must have completed one course, or its equivalent, from each of the following groups: physical/resource geography (Geog 108, 132, 135); population/cultural/political geography (Geog 127, 145, 146); urban/economic geography (Geog 125, 140, 141).

Depending upon the chosen field of specialization, each student will select electives from appropriate courses within the department or from related programs and departments within the University or the Consortium of Universities. The student's program of study will be developed in consultation with the advisor and graduate committee.

*Master of Science and Doctor of Philosophy in the field of geobiology*, see Geobiology.



With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- |         |  |                 |
|---------|--|-----------------|
| 219     | <b>Seminar: Climatology (3)</b>  | Viterito        |
|         | Atmospheric circulation systems, controls, and distribution. Elements of synoptic climatology, including climate modeling.   |                 |
| 220     | <b>Seminar: Climatic Change (3)</b>  | Viterito        |
|         | Climatic history; examination of natural and induced climatic change.  |                 |
| 222     | <b>Seminar: Resources and the Environment (3)</b>  | Lewis, Viterito |
|         | Analysis of the spatial variations and interrelationships of resources and the environment.  |                 |
| 223     | <b>Seminar: The Population-Food Balance (3)</b>  | Price           |
|         | Spatial problems associated with the dynamics and interaction of population growth and agricultural output.  |                 |
| 224     | <b>Seminar: Political Geography (3)</b>  | Staff           |
|         | Examination of the political factor in location theory and analysis of the nature of political territories.  |                 |
| 225     | <b>Seminar: Transportation and Development (3)</b>   | Low             |
|         | Transportation and communication in the organization of space.   |                 |
| 230     | <b>Seminar: Resource Issues in Development (3)</b>   | Lewis           |
|         | A consideration of the differential regional implications of and responses to resource and environmental policy decisions due to regional differences in societal and physical parameters. |                 |
| 243     | <b>Seminar: Urban Geography (3)</b>  | Low             |
|         | Evolving morphology and internal spatial patterns of cities.   |                 |
| 244     | <b>Seminar: Urban Systems and Development (3)</b>  | Staff           |
|         | Central place theory and other theories of urban location and the organization of systems of cities.   |                 |
| 250     | <b>Regional Development (3)</b>  | Hart            |
|         | Geographic perspectives on theory, planning, and programmatic aspects of regional development, with case studies.  |                 |
| 261     | <b>Latin American Geopolitical Trends (3)</b>  | Marasciulo      |
|         | Political and economic factors in a development context; emphasis on natural and human resources and environmental and land use issues.  |                 |
| 265     | <b>Seminar: Geography of the Former Soviet Union (3)</b>   | Staff           |
|         | Survey of the regions and major topical themes of the geography of the former Soviet Union, including population, energy, agriculture, transportation, and regional development.           |                 |
| 266     | <b>Seminar: Geographic Perspectives on Contemporary China (3)</b>  | Staff           |
|         | China's development prospects: environmental constraints, population growth, and regional differences in the context of Chinese cultural patterns and political organization.              |                 |
| 290     | <b>Principles of Demography (3)</b>  | Boulrier        |
|         | Same as Econ/Soc/Stat 290.   |                 |
| 291     | <b>Methods of Demographic Analysis (3)</b>   | Boulrier        |
|         | Same as Econ/Soc/Stat 291.   |                 |
| 295     | <b>Research (arr.)</b>   | Staff           |
|         | May be repeated for credit.  |                 |
| 299-300 | <b>Thesis Research (3-3)</b>   | Staff           |

## GEOLOGY

Professors F.R. Siegel, A.G. Coates (*Research*), R.C. Lindholm, J.F. Lewis, D.J. Stanley (*Research*), G.C. Stephens (*Chair*)  
 Adjunct Professor W. Back  
 Associate Professorial Lecturers J.F. Sutter, W.C. Shanks  
 Assistant Professors R.P. Tollo, L.E. Osterman  
 Assistant Professorial Lecturers L.E. Edwards, M.J. Baedeker, C. Zheng

Master of Science in the field of geology—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science with a major in geology.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Course work must include Geol 205, 240, 261, and 272. Candidates are required to pass a Master's Examination.

Both thesis and nonthesis options are available. Under the thesis option, a minimum of 30 credit hours of course work is required, including Geol 299–300; candidates must pass the Master's Examination before completing their thesis work. Under the nonthesis option, a minimum of 36 credit hours of course work is required; course work must include Geol 128, 189, 219, 274, and 295. Two electives must be chosen from Geol 216 or 263, 211 or 224, 241 or 243, and 254 or 257 or 266.

*Master of Science in the field of geochemistry (an interdepartmental degree offered by the Departments of Geology and Chemistry)*—Prerequisite: a bachelor's degree with a major in geology or in chemistry and, at a minimum, introductory courses in the other field.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Chem 111–12; Geol 240, 241 or 243, 249; Chem 213 or other upper-level chemistry course approved by the advisor; and Geol 299–300. Geol 105, 111, 122, 124, 132, 136, 151, and 152 may not be taken for graduate credit. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. Stat 129 or another course approved by the advisor must be passed.

*Master of Science and Doctor of Philosophy in the field of geobiology*—see Geobiology.

*Doctor of Philosophy in the field of geology*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences and the satisfactory completion of the General Examination in three fields, one of which must be in petrology, stratigraphy, or structural geology.

Research fields: geochemistry, hydrogeology, mineralogy, paleontology, petrology, sedimentology, and structural geology.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

**205 Seminar in Geology (1)**

Staff

Special topics each semester. May be repeated for credit.

**211 Advanced Mineralogy (3)**

Tollo

Review of the detailed structure, crystal chemistry, and phase relations of rock-forming minerals. Application of mineralogic data to the solution of geologic problems is emphasized. Prerequisite: Geol 111, 112 (or equivalent); or permission of the instructor. (Spring, odd years)

**216 Sedimentary Petrography (3)**

Lindholm

Identification, classification, and interpretation of common sedimentary rocks by means of the petrographic microscope. Prerequisite: Geol 112, 261; or permission of instructor. Laboratory fee, \$30. (Fall, odd years)

**219 Petrogenesis (3)**

Lewis

The origin of selected igneous and metamorphic rock types. Prerequisite: Geol 117, 118, or permission of instructor. Laboratory fee, \$25. (Fall)

**224 Advanced Structural Geology (3)**

Stephens

Study of problems in structural analysis and tectonics. Prerequisite: Geol 122. (Spring, odd years)

**240 Principles of Geochemistry (3)**

Siegel

Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 31; Phys 1 or 3; or permission of instructor. Laboratory fee, \$25. (Fall)

**241 Marine Geochemistry (3)**

Siegel

Chemical composition and physical properties of sea water, chemical composition and alterations of marine sediments, thermodynamics and biochemical activity in oceans. Methods of analysis and problems of measuring. Prerequisite: Geol 240 or permission of instructor. Recommended: Chem 22. Laboratory fee, \$25. (Spring, even years)

**243 Applied Geochemistry (3)**

Siegel

Application of geochemical principles and analyses to the detection of mineral and energy resources and to the understanding and alleviation of environmental



- problems based on the chemistry of earth materials. Field trips as arranged.  
Prerequisite: Geol 240. Laboratory fee, \$25. (Spring, odd years)
- 249 **Seminar: Geochemistry (2)** Staff  
Independent topics each semester; may be repeated for credit.
- 254 **Evolutionary Paleobiology (3)** Staff  
Consideration of modern evolutionary theory with emphasis on the fossil record.
- 255 **Quantitative Paleoecology (3)** Staff  
Characteristics of populations applicable to the fossil record. Subject matter includes ecosystem concept, habitat, Hutchinsonian niche, life-death, size-frequency distributions, competitive exclusion principle, spatial distributions, relative abundance and diversity, quantification of community biofacies. Prerequisite: Geol 151-52, Stat 91; or permission of instructor. (Fall, odd years)
- 257 **Micropaleontology (3)** Staff  
Biology, morphology, paleoecology, biogeography, and biostratigraphy of marine and nonmarine phosphatic, organic, siliceous, and calcareous microfossils. Prerequisite: Geol 1-2 or permission of instructor. (Fall, even years)
- 258 **Seminar: Micropaleontology (3)** Staff  
Prerequisite: Geol 257 or permission of instructor. May be repeated for credit. (Spring, odd years)
- 261 **Sedimentology (3)** Lindholm  
Lecture and laboratory, field trips as arranged. Principles of sedimentology, analysis and interpretation of sedimentary processes and environments. Prerequisite: Geol 1; Stat 91; or permission of instructor. Laboratory fee, \$25. (Spring)
- 263 **Sedimentary Environments (3)** Lindholm  
Study of selected depositional environments. Field trips as arranged. Prerequisite: Geol 261. Laboratory fee (field trips), \$30. (Fall, even years)
- 266 **Advanced Stratigraphy (3)** Staff  
Analysis of special topics in stratigraphy. Historical background, concept of facies, cycles of sedimentation, clastic and carbonate subsurface lithofacies, subsurface biostratigraphy, ecological and evolutionary attributes of stratigraphically useful organisms, quantitative methods, isochronology, geochronology, and magnetic stratigraphy. Prerequisite: Geol 166. (Spring, even years)
- 272 **Regional Geology of the Appalachians (3)** Tollo  
Integrated analysis of the structural, stratigraphic, and tectonic evolution of the Appalachian orogenic belt through time. Critical evaluation of recent literature and comparisons with other deformed areas of North America and elsewhere. Required field trips provide opportunities to examine key exposures throughout the Appalachian region. (Spring, even years)
- 274 **Hydrogeology (3)** Back  
The occurrence, storage, movement, quality, and problems of pollution of subsurface water and the hydrologic properties of water-bearing materials. Prerequisite: Geol 111, 122; Math 31; Chem 11-12; or permission of instructor. (Spring)
- 275 **Geochemistry of Groundwater (3)** Back  
Application of geochemical principles to the interpretation and prediction of groundwater activity in regional systems; carbonate and silicate equilibrium; weathering and redox reactions; isotopes; and contaminated aquifers. Prerequisite: Geol 240, 274 (may be taken concurrently), or permission of instructor. (Fall, odd years)
- 276 **Advanced Groundwater: Modeling (3)** Staff  
Review of basic theory of aquifer systems, analysis of aquifer testing, and numerical methods applied to groundwater problems. Prerequisite: Geol 274 or permission of instructor. A knowledge of FORTRAN is desirable. (Spring, odd years)
- 295 **Research (arr.)** Staff  
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit. (Fall and spring)
- 299-300 **Thesis Research (3-3)** Staff
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## HEALTH POLICY

Programs in health policy are offered by Columbian College and Graduate School of Arts and Sciences (see Public Policy), the School of Business and Public Management (see Health Services Management and Policy), and the School of Medicine and Health Sciences (see the Master of Public Health Program in the School of Medicine and Health Sciences Bulletin).

## HEALTH SERVICES MANAGEMENT AND POLICY

Professors K.J. Darr, P.N. Reeves, P.S. Birnbaum, J. Ott, R.F. Southby (Chair), L.G. Pawlson, R. Riegelman, W. Greenberg, D.L. Infeld, P. Budetti, R.S. Hanft, S.R. Eastaugh

Professorial Lecturer D.S. Good

Associate Professors D.L. Zalkind, G.E. Crum

Associate Professorial Lecturer S.M. Spornak

See the School of Business and Public Management for programs of study leading to the degrees of Master of Health Services Administration, Specialist in Health Services Administration, and Doctor of Philosophy.

- 202 Introduction to Health and Medical Care (3)** Staff  
Examination of concepts of health and disease from physical and philosophical perspectives. Description and analysis of various components of the health care system, including medical technology and the health professions. (Fall and spring)
- 203 Organization and Management of Health Services (3)** Darr  
Application of management theory and concepts to health services systems and organizations. Characteristics, functions, and organizational structures of delivery systems. The Deming method of continuous quality improvement. (Fall and spring)
- 206 Quantitative Methods in Health Services Operations (3)** Zalkind  
Concepts and applications of statistical methods in health services operations. Probabilistic reasoning and statistical methodology. Sampling and study design. Critiques of statistical studies and reporting. Prerequisite: Stat 51 or equivalent or permission of instructor: the statistics course must be passed with a grade of B or better within two years prior to enrolling in HSMP 206. (Fall and spring)
- 207 Health Services Information Applications (3)** Zalkind  
Introductory survey of health information systems. Decision-making needs; collection, analysis, and reporting of data. Principles of managing the acquisition and development of health services information systems. Prerequisite: HSMP 206 and knowledge of microcomputer spreadsheet or database software. (Fall and spring)
- 210 Health Economics (3)** Greenberg  
Economics of the health care sector. An economic analysis of public policy alternatives in the health industry. Roles of the physician, hospital, insurance, and other health care markets are examined. Prerequisite: Econ 217 or equivalent. (Fall and spring)
- 211 Health Finance (3)** Eastaugh  
Introductory survey of theoretical and practical approaches to the financial management of health care institutions. Specific attention is given to rate regulation, hospital reimbursement and accounting, financial ratio analysis and feasibility studies, and strategic marketing. Prerequisite: Accy 201 or equivalent. (Fall, spring, and summer)
- 212 Introduction to Health Services Planning (3)** Staff  
Concepts and techniques of project planning and marketing as applied to community and institutional health systems. (Fall and spring)
- 215 Health Services and the Law (3)** Budetti  
The sources of law and the legal processes affecting the health services system. Elements of administrative law and agency processes. Introduction to the legal relationships (e.g., torts and contracts) of facilities, physicians, personnel, and patients. Legal references and sources: statutory and regulatory analysis; trends in health services delivery law. (Fall, spring, and summer)



- 219 **Human Behavior and Human Resources Management in Health Services Organizations (3)** Burdetsky  
Same as Mgt 219.
- 221 **Health Systems Strategic Planning (3)** Staff  
Application of strategic planning concepts to health services. Study of the strategic planning process as a series of interrelated analyses and decisions, including representative analytic methods used in the most critical stages. Discussion of the relationships among strategic planning, project planning, marketing, and financial planning. (Fall and spring)
- 223 **Policy in Strategic Health Services Planning (3)** Staff  
Issue management and political action at state and local levels as part of the strategic management of health services. Application of concepts and techniques useful for identification of strategic issues, stakeholder analysis, policy evaluation, and policy adoption. (Summer)
- 225 **Health Policy Analysis (3)** Hanft  
Same as PubH 225. Understanding and analyzing the processes by which health services policy is formulated and implemented at the federal level. Focus on Congress, the presidency, and the agencies.
- 227 **Seminar: Ethics in Health Services Administration (3)** Darr  
Managerial implications of ethical issues in health services delivery: administrative and institutional ethics; professional codes; decisions concerning impaired professionals, dying patients, fertility control, experimentation, and new technology; resource allocation. (Spring)
- 231 **Managing the Short-Term Hospital (3)** Darr  
Organization and management of the acute care hospital. Relationships and procedures of clinical, support, and administrative departments. Process analyses and applications of the Deming method of continuous quality improvement. Requirements of the Joint Commission on Accreditation of Healthcare Organizations. Prerequisite: HSMP 203. (Fall and spring)
- 233 **Delivery of Mental Health Services (3)** Andrulis  
Study of the organizations and systems for delivery of mental health services; emphasis on managing and financing treatment and rehabilitation facilities. (Summer)
- 236 **Introduction to Long-Term Care Administration (3)** Infeld  
An overview of the field of long-term care and its evolution within the health care and social service systems. The "continuum" of long-term care services, both in institutions and in the community, funding sources for these services, and policy issues involved in delivery of services. Site visits to long-term care programs. (Spring)
- 237 **Managing the Long-Term Care Institution (3)** Staff  
Organization and management of nursing homes, personal and residential care facilities, and institutions for other populations needing long-term specialty treatment. Emphasis on personal and professional skills necessary to provide a wide range of services and quality care in these environments. (Summer)
- 238 **Ambulatory Health Services Management (3)** Staff  
Introduction to the organization and management of ambulatory care. Presentation of models, financing mechanisms, institutional affiliations, estimating and planning for ambulatory care, and the use of group practice of medicine as part of a total system of services delivery. (Spring and summer)
- 239 **Management of Alternative Delivery Systems (3)** Staff  
Principles and fundamentals of prepaid group practice and health maintenance organizations and other alternative financing/delivery mechanisms. Emphasis on planning, development, and operation of HMOs and CMPs, including discussion of models, financial issues, consumers, and providers of care. (Fall and summer)
- 245 **Case Studies in Health Services Administration (3)** Southby, Infeld, Good  
Intensive qualitative and quantitative analyses of major problem areas in health system administration and planning, using the case study method. Cases cover the broad spectrum of health policy, planning, and management of the health services system. A capstone course for MHA students in the last semester of the program. (Fall, spring, and summer)

- 252 **Comparative Health Services Systems** (3) Southby  
Evaluations of various organizational patterns, functions, and trends in international health services delivery systems. Emphasis on sources of such differences and the significance of systems to the health status of a nation. (Spring)
- 255 **Issues in Gerontology** (3) Infeld  
Interdisciplinary seminar on the nature and problems of aging, including demographic, biological, psychological, social, economic, environmental, and political perspectives on the status and needs of the older population. Theory and research; service delivery; attitudes and behaviors based on contact with older persons. (Fall)
- 257 **Advanced Health Resources Management** (3) Eastaugh  
Methods, techniques, and policies used in health resources management. Prospective rate regulation under DRGs, capital investment and buy-lease decisions, financial feasibility studies, cost accounting, and strategic financial planning. Financial management of health care delivery systems. Prerequisite: HSMP 211. (Fall and spring)
- 260 **Administration of Health Systems** (3) Staff  
Same as PubH 213. See the School of Medicine and Health Sciences Bulletin.
- 262 **Economics of Health Care** (3) Greenberg  
Same as PubH 211. See the School of Medicine and Health Sciences Bulletin.
- 263 **Health Services Financial Management** (3) Eastaugh  
Same as PubH 263. See the School of Medicine and Health Sciences Bulletin.
- 264 **Health Planning and Marketing** (2 or 3) Staff  
Same as PubH 214. See the School of Medicine and Health Sciences Bulletin.
- 265 **Health Law** (3) Budetti  
Same as PubH 265. See the School of Medicine and Health Sciences Bulletin.
- 267 **Health and Society** (2) Staff  
Same as PubH 205. See the School of Medicine and Health Sciences Bulletin.
- 268 **Case Studies in Administrative Medicine** (2 or 3) Staff  
Same as PubH 287. See the School of Medicine and Health Sciences Bulletin.
- 270 **Research in Health Services Administration** (3) Southby  
Field research. Primarily for advanced students; open to others with consent of instructor. May be repeated for credit. (Fall and spring)
- 271 **Field Problem Studies** (3) Good  
Work experience guided by a qualified preceptor on selected management and planning issues and problems occurring in health services facilities, programs, and agencies. Primarily for advanced master's and doctoral students; open to other students by arrangement. May be repeated for credit. (Fall, spring, and summer)
- 273-75 **Residency I** (3 each) Staff  
Work experience guided by a qualified preceptor; periodic written progress reports and a written major report or selected field projects as required.
- 276-78 **Residency II** (3 each) Staff  
For students who take additional residency experience.
- 285-86 **Readings in Health Services Administration** (3-3) Southby and Staff  
Supervised readings in special areas of health services management and in policy and planning. Primarily for advanced students; open to others by arrangement. May be repeated for credit. (Fall and spring)
- 290 **Special Topics** (3) Staff  
Experimental offering; new course topics and teaching methods. May be repeated for credit. (Fall or spring)
- 299-300 **Thesis Research** (3-3) Southby
- 310 **Seminar in Health Economics** (3) Greenberg  
Study of major contemporary issues in health policy and health economics. Development and critique of policies designed to deal with current health issues. (Spring)
- 311 **Seminar: Public-Private Sector Institutions and Relationships** (3) Staff  
Same as SMPP 311.
- 330 **Health Services Delivery Policy** (3) Southby  
Study of major contemporary issues in health services delivery. Development and critique of policies designed to deal with those issues. For doctoral and specialist students; to be taken toward the end of course work for the degree. (Fall)



**398 Advanced Reading and Research (arr.)**

Staff

Limited to doctoral candidates preparing for the general examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Staff

Limited to doctoral candidates. May be repeated for credit.

**HISTORY**

Professors H.M. Sachar, P.P. Hill, L.G. DePauw, R. Thornton, L.G. Schworer, P.F. Klarén, R.E. Kennedy, Jr., W.H. Becker (Chair), L.P. Ribuffo, E. Berkowitz, R.H. Spector, J.O. Horton

Associate Professors C.J. Herber, W.R. Johnson, R.A. Hadley, A.D. Andrews, M.A. Atkin, R.B. Stott, H.L. Agnew

Adjunct Associate Professor K. Bowling

Assistant Professors G. Savage, D.R. Khoury

*Master of Arts in the field of history*—Prerequisite: a bachelor's degree from an accredited college or university with a major in history, or with substantial course work in history of high academic quality; high scholastic standing; and approval of the department.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. A thesis program consists of either a minimum of 30 credit hours of 100- and 200-level courses, including Hist 299–300, Thesis Research, and at least three other 200-level courses. A non-thesis program consists of a minimum of 36 credit hours of 100- and 200-level courses, including at least six 200-level courses, two of which must be research seminars. (See the Undergraduate Programs Bulletin for a listing of 100-level courses offered by the department.) Exceptions to the minimum for 200-level courses can be granted only by the department's Graduate Programs Committee. Hist 201 is required of candidates who have not previously had a course in historiography and historical method. A maximum of 6 credit hours may be in approved courses outside the History Department. To receive graduate credit for 100-level courses, master's candidates must arrange for extra work with the instructors. Each student works in two major fields of history, or in one major and one special field, and is required to pass a Comprehensive Examination in each. Major and special fields are listed under Doctor of Philosophy in the field of history, below.

*Master of Arts in the field of history with a concentration in historic preservation*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. This 36-hour master's degree program combines courses in United States history and historic preservation. It includes at least 18 hours of U.S. social history, U.S. urban history, man-made America, and the seminar sequence in historic preservation. For other course distribution requirements, see the departmental graduate advisor. Candidates in this program may also be required to pass an examination in measured architectural drawing.

*Master of Arts in the field of history with a concentration in public policy*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. This 36-hour program emphasizes the study of history as it relates to the analysis and conduct of public policy. Hist 213 and an internship are required. Additional course work is to be chosen with advisor's approval.

*Doctor of Philosophy in the field of history*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including the passing of a written examination in two appropriate foreign languages or in one foreign language and an approved subject (such as statistics or oral history), and the satisfactory completion of the General Examination in four fields. Normally, each doctoral candidate will work in one major (or general) field of study and three special fields. One of the special fields may be taken as a "write-off" at the end of the first year of the program, so long as it is not in the area in which the candidate plans to write the dissertation. Major fields include the following: early modern Europe, modern Europe, United States, Latin America, modern Middle East, modern East Asia, modern Eastern Europe, modern Russia and the Soviet Union, and military history. Special fields may vary from the topical (e.g., U.S. social history, European intellectual history, historic preservation, etc.) to the chronologically limited fields (e.g., American colonial history, classical and medieval Europe, Tudor and Stuart England, etc.). A student may elect one special field outside the History Department if it is relevant to the

program. Students having a special field in historic preservation may be required to pass an examination in measured architectural drawing. In the final 24 hours of course work for the General Examination the candidate may enroll only in third-group courses. Any exception requires the approval of the Graduate Programs Committee.

*Doctor of Philosophy in the field of American religious history* (offered in cooperation with the Department of Religion)—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences and the specific requirements of the Doctor of Philosophy in the field of history, stated above. The General Examination must cover four fields, including two from the Department of History (generally American social history and one other) and two from the Department of Religion (history of religion in America and one other field in religious history).

- 201 **History and Historians** (3) Staff  
 Historiography and historical method for graduate students. Readings and discussions on major trends in history: selections from classics of historical literature. Students who receive credit for Hist 201 cannot receive credit for Hist 198. (Spring)
- 203-4 **Seminar: Research or Readings** (3-3) Staff  
 Offered on demand for individual research programs. Prerequisite: approval of department. (Academic year)
- 205 **Readings Seminar: Eastern European History, 1772-1918** (3) Agnew  
 (Fall)
- 206 **Readings Seminar: Eastern European History, 1919-1945** (3) Agnew  
 (Spring)
- 209 **Readings/Research Seminar: Topics in Ancient History** (3) Hadley  
 Readings on general topics in the history of the ancient Near East, Greece, or Rome. Topics to be announced in the *Schedule of Classes*. Students with working knowledge of the appropriate language(s) may receive research credit.
- 211 **Readings/Research Seminar: Medieval History** (3) Andrews  
 Reading of major works from the medieval period, along with modern studies. Students with working knowledge of Latin may receive research credit. Prerequisite: Hist 111 or 112 or equivalent; open to nonmajors. (Spring)
- 213-14 **Readings/Research Seminar: History and Public Policy** (3-3) Berkowitz  
 Seminar in the use of historical insights and methods in policy-making, with emphasis on domestic issues. Assessment and use of primary sources for policy analysis and the use of historical analogy in policy formulation.
- 217 **Readings/Research Seminar: Russian and Soviet Thought** (3) Atkin  
 Selected topics in the intellectual, social, and cultural history of 19th- and 20th-century Russia and Soviet Union.
- 218 **Readings/Research Seminar: Soviet Nationalities** (3) Atkin  
 An examination of the relationship between the U.S.S.R.'s multinational composition and its domestic political, economic, social, and cultural policies and foreign relations. Admission by permission of instructor. (Spring)
- 219 **Internship in History and Public Policy** (3 or 6) Berkowitz  
 Supervised participation in an office or agency concerned with the formulation of public policy; terms of the internship are arranged with the Director of the History and Public Policy Program. Enrollment restricted to students in the History and Public Policy Program. (Fall and spring)
- 220 **American Business History** (3) Becker  
 The history of American business institutions in manufacturing, distribution, transportation, and finance. Particular attention will be given to the period since industrialization, with consideration of business institutions in their economic, legal, governmental, and social contexts. Same as BAad 293. (Spring)
- 224 **Readings/Research Seminar: European Intellectual History** (3) Kennedy  
 Cultural history of the French Revolution. Interrelated changes in political and economic thought, theater, arts, religion, and science from 1789 to 1799. Continuity or discontinuity with pre- and post-revolutionary cultural life.
- 225 **History of Washington, D.C.** (3) Gillette  
 Same as AmCv 225.
- 228 **Readings/Research Seminar: Modern Military and Naval History** (3) Spector  
 Discussion, readings, and research in 20th-century European and American military and naval history.



- 229 **Seminar: World War II (3)** Spector  
Examination of statecraft and the management of force before, during, and after World War II. Special attention to broad aspects of military policy and strategy and their interaction with international politics and diplomacy.
- 230-31 **Readings/Research Seminar: Strategy and Policy (3-3)** Spector  
Hist 230: A study of the historical development of strategy and the relationship of military thought to national policy. Hist 231: 20th-century strategic thought. (Academic year)
- 232 **Communism and Democratization (3)** Wolchik  
Same as PSc 232.
- 237 **Readings Seminar: Soviet Foreign Policy, 1917-1964 (3)** Staff  
Concepts and perceptions guiding Soviet relations with the outside world. From the blockade and intervention, through years of isolation, World War II, the Cold War, to "peaceful coexistence."
- 239 **Readings Seminar: Early Modern European History (3)** Schwoerer  
Topics selected from Western European history of the 14th through 17th centuries.
- 241 **Readings/Research Seminar: Modern European History (3)** Herber  
Prerequisite: appropriate preparation and consent of instructor
- 246 **Readings/Research Seminar: History of Modern Russia and Soviet Union (3)** Atkin  
Selected topics in the domestic history of modern Russia and Soviet Union. (Fall)
- 249 **Research Seminar: European Diplomatic History (3)** Staff  
Research seminar in individually selected topics concerning the foreign policies, actions, and interrelations of the European great powers and their statesmen in the 19th or 20th century. Reading knowledge of one language other than English required. (Fall)
- 251 **Readings/Research Seminar: English People and Institutions (3)** Schwoerer  
Selected topics in the political, social, intellectual, and economic history of England. Focus upon one time period and special area of interest. (Fall and spring)
- 253-54 **Readings Seminar: History of Sino-Soviet Relations (3-3)** Thornton  
Seminar designed to develop analytic and historiographic skills. Fall: turn of the century to 1949; spring: Korean War to the present. (Alternate academic years)
- 255-56 **Readings Seminar: U.S.-Soviet Strategic Relations Since World War II (3-3)** Thornton  
Seminar designed to develop a conceptual framework for understanding contemporary U.S.-Soviet relations. Fall: World War II to 1965; spring: 1965 to the present. (Academic year)
- 258 **Communist Party of the Soviet Union (3)** Sodaro  
Same as PSc 258.
- 259-60 **Research Seminar: Problems in U.S.-Soviet-Chinese Relations (3-3)** Thornton  
Development of scholarly skills through preparation of a research paper. Prerequisite: Hist 254 or 255 or permission of instructor. (Alternate academic years)
- 261-62 **Readings/Research Seminar: Topics in Modern Latin America (3-3)** Klarén  
Admission by permission of the instructor.
- 267 **Readings/Research Seminar: American Social Thought Since World War II (3)** Ribuffo  
Consideration of C. Wright Mills, Daniel Bell, Abraham Maslow, Christopher Lasch, Paul Goodman, Martin Luther King, Jr., Barbara Ehrenreich, and other major social critics. (Fall)
- 271-72 **Readings/Research Seminar: U.S. Social History (3-3)** Horton  
Hist 271: Readings seminar on American daily life, institutions, and intellectual and artistic achievements. Hist 272: Research seminar. Hist 271 is prerequisite to Hist 272.
- 273 **Studies in Early American Culture (3)** Seavey  
Same as AmCv/Engl 273.

- 275-76 **Readings/Research Seminar: U.S. Political and Colonial History** (3-3) Staff  
Research or readings, depending on students' interest and curricular needs. Topics on various aspects of the colonial period or political aspects of various periods. Admission by permission of instructor. (Academic year)
- 277-78 **Historic Preservation: Principles and Methods** (3-3) Longstreth  
Same as AmCv 277-78.
- 279 **Seminar in Historical Editing** (3) Bickford  
Tenets of modern historical editing in the United States, with the First Federal Congress Project as a working example. Hands-on experience through individual editing projects. (Spring)
- 282 **History of U.S. Foreign Policy, 1775-1975** (3) Hill  
Readings, lectures, discussion on major developments in the conduct of American diplomacy. (Fall and spring)
- 283-84 **Readings/Research Seminar: Recent U.S. History** (3-3) Ribuffo  
Prerequisite: 6 credit hours of 100-level American history courses. Research or readings, depending on students' interests and curricular needs.
- 285 **Readings Seminar: Military and Women's History** (3) DePauw  
Admission by permission of instructor. (Fall, alternate years)
- 286 **Research Seminar: Military and Women's History** (3) DePauw  
Admission by permission of instructor. (Spring, alternate years)
- 289 **Readings/Research Seminar: Modern Japanese History** (3) Staff  
Selected topics in modern Japanese history from the Meiji Restoration of 1868 to the present. Research or readings depending on students' interests and curricular needs. (Spring)
- 291 **Readings/Research Seminar: 20th-Century History** (3) Sachar  
Research or readings on selected topics. (Fall)
- 292 **Readings/Research Seminar: Israel, Zionism, and the Arab World** (3) Sachar
- 293 **Research Seminar: Modern East Asian History** (3) Johnson
- 294 **Research Seminar: The Modern Middle East** (3) Staff  
Readings, discussion, and research in selected political, economic, social, cultural, and international developments in the 19th and 20th centuries concerning countries from the Balkans, through Turkey and the Arab countries, to Iran. (Spring)
- 295-96 **Readings Seminar: Modern East Asian History** (3-3) Johnson
- 297 **Special Topics Seminar** (3) Staff  
Open to doctoral and master's candidates and qualified undergraduates. May be repeated for credit. Offered whenever five or more students can be enrolled.
- 298 **Dumbarton Oaks Courses** (arr.)  
Courses offered each year by scholars in residence at Dumbarton Oaks are open to qualified graduate and undergraduate students with permission of department chairman. Topics will be announced. May be repeated for credit provided the topic differs.
- 299-300 **Thesis Research** (3-3) Staff
- 301-14 **Folger Institute Seminars** (3 each) Staff  
Topics will be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs. Consult the chair of the department before registration.
- 342 **Readings in Modern European History** (3) Staff  
From the French Revolution to the period following World War I. (Spring)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## HUMAN RESOURCE DEVELOPMENT

See Human Services.

## HUMAN SCIENCES

### Committee on the Human Sciences

P.J. Caws (Director), I. Azar (Associate Director), A. Altman, J.C. Kuipers, E. Marder, M.S. Soltan, C. Sponsler, J.-F. Thibault, D.D. Wallace, R.A. Wallace



Columbian College and Graduate School of Arts and Sciences offers an interdepartmental program leading to the degree of Doctor of Philosophy in the field of human sciences. The program is administered by a committee whose members are drawn from cooperating departments, which include American Studies, Anthropology, Art, Economics, English, History, Philosophy, Psychology, Religion, Romance Languages, Sociology, and Theatre and Dance. The program in the human sciences is part of the growing interdisciplinary trend that employs methods and principles common to the humanities and social sciences for examination of culture and meaning.

General requirements for the degree are stated under Columbian College and Graduate School of Arts and Sciences. A Bachelor of Arts with a major in one of the cooperating disciplines or a related discipline is required for admission.

The program of study must include the following. (1) 72 credit hours of course work (48 hours for students with master's degrees in related disciplines), which may include up to 24 hours of dissertation research. (2) One designated core course in each of the following six areas: archaeology of the human sciences; contemporary theory in the human sciences; language, meaning, and interpretation; historical issues in the human sciences; culture and society; techniques of critical reading. Specific courses that meet the core course requirements are to be announced. (3) Demonstrated proficiency in two foreign languages. (4) A General Examination that covers the core requirements and the student's chosen concentration.

Cooperating departments may offer specialized course sequences that will enable students to earn the degree with a concentration in a given field; such cases may entail further requirements. Students interested in a departmental concentration should see a program advisor.

#### HUMAN SERVICES

Professors C.E. Vontress, D. Linkowski, E.W. Kelly, Jr., J.C. Heddesheimer, D.W. Dew (Research), C.H. Hoare (Chair)

Associate Professors N.E. Chalofsky, D.R. Schwandt

Adjunct Associate Professor B.B. Cuje

Assistant Professors J. Garcia, G.R. Andrus, H.W. Nashman, N.O. Berger (Visiting), A.L. Schamber (Visiting), S.A. Marotta (Visiting)

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Education Specialist, and Doctor of Education.

#### COUNSELING

- |     |  |                      |
|-----|--|----------------------|
| 220 | <b>Special Workshop</b> (arr.)   | Staff                |
|     | Topics to be announced in the <i>Schedule of Classes</i> . May be repeated for credit.   |                      |
| 251 | <b>Foundations of Counseling</b> (3)   | Heddesheimer, Kelly  |
|     | Introductory survey: definitions, scope, principles, historical background, social and cultural foundations, services, emerging trends, ethics, and issues. (Fall and spring)  |                      |
| 252 | <b>Small-Group Self-Awareness Workshop</b> (0)   | Staff                |
|     | Experimental activities for enhancing self-awareness. For graduate students in counseling only. Laboratory fee, \$150.   |                      |
| 253 | <b>Counseling Interview Skills</b> (3)   | Heddesheimer, Garcia |
|     | Acquisition of counseling skills common to all theories through lectures, demonstrations by faculty, role playing, and videotaping. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall, spring, and summer) |                      |
| 254 | <b>Personal and Social Adjustment</b> (3)  | Hoare                |
|     | Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Fall)  |                      |
| 255 | <b>Career Counseling</b> (3)   | Vontress             |
|     | A consideration of theory, practice, and the body of information related to career counseling, choice, and development over the life span. Prerequisite: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall)   |                      |

- 257 Individual Assessment in Counseling (3)** Staff  
Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); Psyc 131 or Educ 121 or permission of instructor is required for others. (Fall)
- 259 Theories and Techniques of Counseling (3)** Vontress  
An introduction to basic counseling and psychotherapeutic theories and associated techniques. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Fall and spring)
- 261 Group Counseling (3)** Hedgesheimer, Kelly, Linkowski  
Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring and summer)
- 262 Elementary School Counseling (3)** Kelly, Hedgesheimer  
Guided study of the environmental and specialty elements of school counseling, with special attention to the principles and practices of elementary school counseling. Includes 20 hours of supervised prepracticum field activities in an elementary school counseling program. (Fall, spring, summer)
- 263 Cross-Cultural Counseling (3)** Vontress  
A consideration of procedures for, and impediments to, counseling culturally different clients. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring and summer)
- 264 Counseling and Religion (3)** Kelly  
The theoretical and practical intersection of counseling, psychotherapy, and mental health considerations with religion and spirituality. The clinically effective and ethically responsible integration of religion and spirituality into counseling. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Spring)
- 265 Existential Counseling (3)** Vontress  
Consideration of how existential concepts such as courage, authenticity, freedom, meaning, existential anxiety, and responsibility may be used to develop a philosophical approach to counseling, including discussion of the existential counseling relationship, diagnostic procedures, and intervention strategies.
- 266 Secondary School Counseling (3)** Kelly, Hedgesheimer  
Guided study of the environmental and specialty elements for school counseling, with special attention to the principles and practices of secondary school counseling. Includes 20 hours of supervised prepracticum field activities in a secondary school counseling program. (Fall, spring, summer)
- 267 Foundations of Employee Assistance Programs (3)** Staff  
History, legislation, and foundations of practice of counseling in employee assistance programs. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others.
- 269 Counseling Substance Abusers (3)** Staff  
Individual, group, family, and self-help counseling applied to substance abusers. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others.
- 271 Family Counseling (3)** Kelly  
The family as a system: how it affects the client and how the client affects it. Didactic presentations, role playing, and work with simulated families. Prerequisite or concurrent registration: Cnsl 251 or 276 (for counseling majors); permission of instructor is required for others. (Spring)
- 272 Human Sexuality for Counselors (3)** Hoare  
The purpose of this course is to increase the awareness and understanding of sexuality as it relates to counseling in contemporary society. Prerequisite or concurrent registration: Cnsl 251 or 276 (for counseling majors); permission of instructor is required for others. (Spring)
- 274 Counseling Older Persons (3)** Linkowski  
Special considerations and counseling emphases in regard to the life transitions and role changes that occur for older persons. Prerequisite or concurrent registration: Cnsl 251 (for counseling majors); permission of instructor is required for others. (Summer)



- 276 **Foundations of Rehabilitation Counseling** (3) Garcia  
Survey of history, philosophy, legislation, roles, and services. Visits to selected field sites. (Fall)
- 278 **Psychosocial Aspects of Disabilities** (3) Linkowski  
Impact of disabilities and concept of normalization. (Fall)
- 280 **Job Placement and Supported Employment** (3) Linkowski and Staff  
Job development and modification: placement of disabled persons. (Spring)
- 281 **Medical Aspects of Disabilities** (3) Garcia  
Chronic and traumatic disorders with rehabilitation implications. (Spring)
- 284 **Practicum in Counseling** (1) Staff  
Part of a two-semester clinical experience for degree candidates in counseling. Prerequisite: Cnsl 253, 255, 257, and 259; prerequisite or concurrent registration: Cnsl 261; concurrent registration: Cnsl 285. (Fall, spring, and summer)
- 285 **Internship in Counseling I** (2) Staff  
Part of a two-semester clinical experience for degree candidates in counseling. Concurrent registration: Cnsl 284. (Fall, spring, and summer)
- 286 **Internship in Counseling II** (3) Staff  
Part of a two-semester clinical experience for degree candidates in counseling. Prerequisite: Cnsl 285. (Fall, spring, and summer)
- 293-94 **Research and Independent Study** (1 to 3) Staff  
Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)
- 298-99 **Thesis Research** (3-3) Staff
- 352 **Organization and Administration of Counseling Services** (3) Vontress  
Principles and procedures for designing and implementing counseling services. Admission by permission of instructor. (Spring)
- 353 **Work, Identity, and Adult Development** (3) Hoare  
The influence of work on identity, intellectual and personality development, and other developmental attributes. (Fall)
- 358 **Advanced Theories of Counseling** (3) Vontress  
Critical analysis and evaluation of leading counseling theories and consideration of their implications for practice. For Ed.S. and Ed.D. degree candidates in the field of counseling. Admission by permission of instructor. (Fall)
- 359-60 **Doctoral Internship in Counseling** (3-3) Heddesheimer, Kelly
- 361 **Seminar: Counseling** (arr.) Kelly
- 391 **Dissertation Research** (arr.) Staff  
Prerequisite: Educ 390.

#### HUMAN RESOURCE DEVELOPMENT

- 220 **Special Workshop** (arr.) Staff  
Topics to be announced in the *Schedule of Classes*. May be repeated for credit.
- 236 **Technology and Human Resource Development** (3) Andrus  
Human resource development's role and strategies in managing training and performance improvement technology.
- 239 **International and Multicultural Human Resource Development** (3) Staff  
HRD and adult learning issues associated with international and intercultural change; cultural issues of diversity within U.S. organizations. (Spring)
- 263 **Human Resource Development** (3) Chalofsky, Andrus  
Foundations and evolution of HRD; ethics and philosophy; societal/organizational issues. (Fall and spring)
- 264 **Design of Adult Learning in Human Resource Development** (3) Chalofsky  
Training, education, and development programs for various client systems are planned using conceptual models. (Spring)
- 272 **Internship in Adult Learning and Human Resource Development** (3 to 6) Staff  
Supervised experience in selected areas of: human resource development and adult education. Admission by permission of instructor. (Fall and spring)
- 274 **Group and Organizational Theories** (3) Staff  
Same as Educ 274.
- 279 **Adult Education** (3) Hoare  
Current concepts and objectives, historical development, agencies involved, personnel, clients, programs on all levels—community through international.

- 280 Program Planning in Adult Education (3)** Hoare  
Determining educational needs for adults in school and nonschool agencies; designing programs and instruction; budgeting and scheduling of adult programs. Field work with sponsoring agency. Prerequisite: HRD 279 and permission of instructor.
- 281 Adult Learning (3)** Hoare  
Learning theories as applied to adults in individual and group learning transactions; effect of age on learning; psychological, physical, and social environment in adult education situations. (Spring and summer)
- 282 Strategies for Adult Learning (3)** Chalofsky  
Methods, techniques, and approaches; developing action-oriented learning situations for organizations. (Fall and spring)
- 283 Interviewing/Counseling for Human Resource Developers (3)** Staff  
Applications of interviewing, coaching, and counseling skills for the human resource development specialist and others in various occupational settings.
- 284 Evaluation of Human Resource Development Programs (3)** Staff  
Evaluation design strategies for adult learning programs in business, industry, government, voluntary and community organizations, and agencies. (Fall)
- 286 Issues in Human Resource Development Programs (3)** Chalofsky, Andrus  
Current issues and trends in the fields of human resource development. (Fall and spring)
- 287 Management of Human Resource Development Programs (3)** Chalofsky, Schwandt  
Management of organizational units involved in promoting HRD activities.
- 289 Consulting Skills in Human Resource Development (3)** Schwandt  
Examination of the consulting process, consultant-client behaviors, and dilemmas, using theory and field experience for individual and organizational development. (Fall and spring)
- 293-94 Research and Independent Study (1 to 3)** Staff  
Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)
- 299-300 Thesis Research (3-3)** Staff
- 321 Seminar: Advanced Issues in Human Resource Development (arr.)** Chalofsky, Schwandt
- 327 Seminar: Applied Research in Human Resource Development (arr.)** Chalofsky, Schwandt
- 379 Practicum in Adult Learning Programs (3 to 6)** Staff  
Supervised practical experience in various forms of human resource development. Admission by permission of instructor. (Fall and spring)
- 391 Dissertation Research (arr.)** Staff  
Prerequisite: Educ 390.

## INDIVIDUAL GRADUATE PROGRAMS

### Committee on Individual Programs

C.E. Rice (Program Director), A.D. Andrews, J.J. Cordes, W.B. Griffith, T.L. Hufford

Students with special academic goals may pursue individualized programs of study toward the Master of Arts or Master of Science, subject to approval by the Committee on Individual Programs and the dean. Courses must be drawn from a minimum of three fields, with a maximum of 18 hours from any one field. A majority of courses must be taken within Columbian College and Graduate School of Arts and Sciences. The comprehensive examination is a final essay in which the integration of the program of study is demonstrated.

The Graduate School offers the course listed below primarily for students with individualized interdisciplinary programs of study for the master's degrees. The Committee on Individual Programs, which has supervisory responsibility for Individual Programs students, provides the faculty for the Colloquium.

- 250 Colloquium on Interdisciplinary Methodologies (3)** Staff  
Analysis from several perspectives of the problems inherent in interdisciplinary study and research, conditions that justify interdisciplinary work, norms and strategies for success, and case studies. (Offered as the demand warrants)



## INFORMATION SYSTEMS

Programs in information systems are offered by Columbian College and Graduate School of Arts and Sciences (see Administrative Sciences and Virginia Campus); the School of Business and Public Management (see Master of Science in Information Systems Technology and Master of Business Administration with a field in Information Systems Management); and the School of Engineering and Applied Science (see Computer Science under Electrical Engineering and Computer Science fields, Information Management under Engineering Management fields, and Mathematical Modeling in Information Systems under Operations Research fields).

## INTERNATIONAL AFFAIRS

Professors W.H. Becker, E. Berkowitz, B.L. Boulier, M.D. Bradley, J. Chaves, J.J. Cordes, R.M. Dunn, Jr., M.A. East, J.A. Frey, F. Ghadar, O. Havrylyshyn, J. Henig, P.P. Hill, M.A. Holman, C.C. Joyner, R.E. Kennedy, Jr., Y. Kim, P.F. Klarén, J.E. Kwoka, Jr., P. Lauter, W.H. Lewis, C.A. Linden, J.M. Logsdon, J.C. Lowe, J. Manheim, C. McClintock, J. Millar, J.A. Morgan, Jr., C.A. Moser, H.R. Nau, J. Pelzman, J.M. Post, P. Reddaway, B. Reich, L.P. Ribuffo, H.M. Sachar, B.M. Sapin, C.W. Shih, G. Sigur, M. Sodaro, H. Solomon, R.H. Spector, R. Thornton, D.E. Vermeer, S. Wolchik, A.M. Yezer

Adjunct Professors R. Butterworth, T.F. Carroll, K.S. Flamm, J. Hardt, S.E. Johnson, R.D.F. Palmer, E.L. Warner

Professorial Lecturers J. Banister, E.G. Griffin, J. Urban

Associate Professors H.L. Agnew, C.J. Allen, M.A. Atkin, N.J. Brown, C.J. Deering, C.F. Elliott, H.B. Feigenbaum, C.J. Herber, W.R. Johnson, Y.K. Kim-Renaud, J. Kuipers, M.C. LaFollette (Research), J.H. Lebovic, D.L. Lee, G. Ludlow, Y. Olkhovsky, F. Robles, R.W. Rycroft, S.C. Smith, P. Steinhardt, R.Y. Yin

Adjunct Associate Professors M.B. Wallerstein, R.R. Garcia

Associate Professorial Lecturer G.R. Kieval

Assistant Professors M. Finnemore, D. Hart, M.D. Moore, S. Suranovic, N.S. Vonortas, G.C.Y. Wang

The Elliott School of International Affairs offers a multidisciplinary program leading to the degree of Master of Arts in the field of international affairs. The program provides students with a broad background in the general areas of international affairs as well as opportunities to specialize in one of the traditional disciplines or in a regional area.

*Master of Arts in the field of international affairs*—This multidisciplinary program offers a wide range of choice and flexibility among fields and courses within a framework that emphasizes intellectual development in more than one academic discipline and practical policy-oriented study in special-functional or regional-area fields. Students may take graduate courses in anthropology, business administration, economics, geography and regional science, history, political science, psychology, sociology, and other disciplines.

*Prerequisite:* the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. *Required:* the general requirements stated under the Elliott School of International Affairs. All degree candidates must take 36 credit hours of course work and prepare for comprehensive examinations in three fields. Candidates select at least one general field from those listed below and may take no more than 21 hours in one department. Students may write a thesis if they qualify by having a minimum 3.5 grade-point average, submitting a previously written research paper of high quality, and developing a formal thesis proposal approved by their prospective thesis advisor. Thesis candidates may take no more than 15 hours of course work in any one department.

Beyond these limits, students are free to select any of the fields listed below, so long as they comprise a coherent program. Courses should be chosen with a view to their relevance to the selected fields. Candidates will be examined on their selected fields in the Master's Comprehensive Examination.

*General fields*—At least one general field must be chosen from international politics (PSc 240 and 241), comparative politics (PSc 230 and 231), modern political theory (PSc 205 and either 206 or 207), and international economics (Econ 283–84, to which Econ 217–18 or equivalent is prerequisite).

*Special fields*—Fields regularly offered include international law, international organization and administration, international economic development, international business,

international health and development, comparative aspects of communism and post-communist systems, U.S. foreign policy, history of strategy and policy, political psychology, and science, technology, and public policy.

*Regional fields*—Western Europe, Eastern Europe, former Soviet Union/Russia, Middle East, Africa, South and Southeast Asia, China, Japan, and Latin America. (For each geographic region, courses are generally available in modern history, government and politics, and economic problems.)

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of their program.

The following courses carry the International Affairs (IAff) designation. All other courses listed above will be found under the appropriate department designation.

- 222 **Science, Technology, and Public Affairs** (3) Logsdon, Rycroft  
Introduction to the study of science, technology, and public policy; focus on policy issues that arise from interactions between scientific and technological developments and government activity. (Fall)
- 223 **Science, Technology, and International Affairs** (3) Vonortas  
Exploration of implications of technological change for international economic politics.
- 253 **Defense Policy and Program Analysis I** (3) Johnson  
Examination of how national security policy is formulated and translated into a defense budget, program priorities, and force structure. Focus on nuclear forces.
- 254 **Defense Policy and Program Analysis II** (3) Johnson  
Analysis of national security decision making and the methodology by which defense programs are evaluated and priorities are set. Focus on general purpose (conventional) force structure.
- 255–56 **Applied Quantitative Techniques** (3–3) Butterworth  
The application of quantitative techniques in the solution of issues in defense policy.
- 287 **Problems in Latin American Civilization** (3) Klarén and Associated Faculty  
Interdisciplinary seminar; each student writes a report on some aspect of a selected key theme. May be repeated for credit. Admission by permission of instructor.
- 290 **Special Topics in International Affairs** (3) Staff  
Courses designed to focus on international affairs issues of a more current or topical nature. Topics announced in the *Schedule of Classes*.
- 291 **Colloquium: East Asia** (3) Staff  
Colloquium for advanced students of East Asian affairs. Admission by permission of the instructor.
- 292 **Colloquium: Russia and Eastern Europe** (3) Staff  
An advanced seminar on political and economic developments since the 1950s, with focus on the current period. Guest lectures on current research and analysis by visiting scholars and practitioners.
- 293 **Colloquium: National Defense Policies and Issues** (3) Staff  
Colloquium for advanced students of security policy studies. Admission by permission of the instructor.
- 295 **Colloquium: Europe** (3) Sodaro  
Survey of current research on Europe. Research paper required. Required of M.A. candidates in European studies; open to others with instructor's permission.
- 298 **Independent Study and Research** (1 to 3) Staff  
Limited to M.A. degree candidates. Written permission of instructor required.
- 299–300 **Thesis Research** (3–3) Staff

## INTERNATIONAL BUSINESS

Professors P.D. Grub, G.P. Lauter, R. Eldridge, F. Ghadar (Chair), Y.S. Park, H.G. Askari  
Associate Professor F. Robles  
Assistant Professors K. Visudtibhan, M.L. Egan, S.S. Rehman

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.



- 260 The New Global Competitive Framework (3)** Lauter, Rehman, Egan  
The global competitive framework and how nations develop sustained competitive advantages. The EC's 1992 integration plan and post-1992 economic/money union; the transformation of Central and East European economies; and the internationalization of the Japanese economy, with reference to the United States. (Fall and spring)
- 261 Multinational Corporations in the World Economy (3)** Ghadar, Grub, Lauter, Visudtibhan  
Business in the world economy; multinational corporations as economic, political, and social institutions; ownership and growth strategies, relationships to other nations; national and international controls; future of the multinational corporation. (Fall and spring)
- 263 Legal Aspects of International and Multinational Business (3)** Peterson  
Legal environment of international and multinational business including legal systems, antitrust laws, regulation of direct investment, international arbitration and expropriation; topics of current interest. (Fall and spring)
- 266 International Marketing (3)** Robles  
Organizational structures. Analysis of international markets. Market-entry strategies and product policies. Special issues. Channels of distribution, promotional and price policies. Prerequisite: MLOM 240. (Fall and spring)
- 267 Regional International Marketing Systems (3)** Robles  
Discussion of the political, economic, legal, and social characteristics of Latin America, Asia, the Middle East, and China, as they affect the marketing of goods and services in these regions. Identification of business opportunities and risks in these areas. (Fall and spring)
- 271 International Business Finance (3)** Ghadar, Park, Askari  
Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: Fina 120 or 220. (Fall and spring)
- 273 Seminar: International Banking (3)** Park, Ghadar  
International financial intermediation and international banking. Functioning of international financial markets, public policy issues in international banking, regulation of multicountry banking institutions, and the effect of international banks on national monetary policies. Prerequisite: IBus 271. (Fall and spring)
- 275 External Development Financing (3)** Bruck  
Policies, institutions, instruments, and theory of external development financing; financial flows to developing countries; the role of international, regional, and national development banks; technical cooperation and the importance of international financial markets for developing countries. (Fall and spring)
- 276 Seminar: International Financial Markets (3)** Park, Askari, Ghadar  
Theory and practice of international financial markets. Operation and structure of the Eurocurrency market, such as interbank operations, Eurodollar CDs, and floating-rate Eurocredits. Control of the Eurocurrency market and the role of other financial centers. Study of Eurobond and floating-rate note markets as well as major foreign bond markets. Prerequisite: IBus 271 or 273. (Fall and spring)
- 278 International Business Negotiations (3)** Ghadar  
Characteristics and process of International Business Negotiations (IBN). Formulation of concepts and preliminary frameworks; development of systematic approaches to planning for and conducting IBN. Integration of other functional and international aspects in the broader environmental framework. Prerequisite: IBus 260. (Fall and spring)
- 290 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 298 Directed Readings and Research (3)** Staff  
Supervised readings or research in selected fields within business administration. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)
- 299 Thesis Seminar (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311.

- 361 **Colloquium on International Business** (3) Eldridge, Ghadar  
Examination of selected topics in international business, with emphasis on major new theoretical and empirical developments. (Fall)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to doctoral candidates. May be repeated for credit.

## LATIN AMERICAN STUDIES

**Program Committee:** P.F. Klarén (Director), C.J. Allen, Y. Captain-Hidalgo, C. McClintock, M. Price, J. Quiroga, R. Valero, I. Vergara, B. von Barghahn

The Elliott School of International Affairs offers a multidisciplinary program leading to the Master of Arts in the field of Latin American studies.

*Master of Arts in the field of Latin American studies*—Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School of International Affairs.

The program offers a 30-credit-hour option with a thesis or a 36-credit-hour option without a thesis. All students must take the interdisciplinary seminar, IAff 287, *Problems in Latin American Civilization*. (Students with no previous course work in Latin American history, politics, literature, geography, or anthropology should consult with the program director to determine ways to acquire the necessary background.)

All students must demonstrate proficiency in Spanish or Portuguese through a reading comprehension examination. For students whose native language is Spanish or Portuguese, an English language examination will be substituted.

Degree candidates who choose the thesis option must take Master's Comprehensive Examinations in two fields. This can include one major field (12 credit hours, including IAff 287) and one minor field (6 credit hours), or it can be two major fields (9 credit hours each).

Those who select the nonthesis option must take Master's Comprehensive Examinations in three fields, which can include one major field (12 hours) and two minor fields (6 hours each) or two major fields (9 hours each) and one minor field (6 hours). One minor field may be selected from demography, international business, rural development, tourism studies, women's studies, and science, technology, and public policy. At least two courses must be research seminars requiring a substantive paper.

The following graduate courses pertain to Latin American studies.

- Anth 220 *The Anthropology of Development*
- Anth 221 *Key Variables in the Development Process*
- Anth 263 *Seminar: Culture Contact and Change*
- Anth 268 *Seminar: Peasant Society*
- Anth 272 *Seminar: Anthropology of Latin America*
- Anth 282 *Seminar: Advanced Archaeology—New World Prehistory*
- Econ 251 *Development Economics I*
- Econ 252 *Development Economics II*
- Econ 283 *Survey of International Trade Theory and Policy*
- Econ 284 *Survey of International Macroeconomics and Finance Theory and Policy*
- Econ 285–86 *Economic Development of Latin America*
- Geog 222 *Seminar: Resources and the Environment*
- Geog 223 *Seminar: The Population–Food Balance*
- Geog 250 *Seminar: Regional Development*
- Geog 261 *Seminar: Geography of Latin America*
- Hist 261–62 *Readings/Research Seminar: Topics in Modern Latin America*
- IAff 287 *Problems in Latin American Civilization*
- PSc 283 *Governments and Politics of Latin America*
- PSc 284 *International Relations of Latin America*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.



## LEGISLATIVE AFFAIRS

*Academic Director C.J. Deering*

Columbian College and Graduate School of Arts and Sciences offers a program leading to the degree of Master of Arts in the field of legislative affairs. This program focuses on the U.S. Congress with emphasis on the legislative process, American political institutions, and public policy analysis.

**Master of Arts in the field of legislative affairs**—Prerequisite: a bachelor's degree with a B average from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The curriculum of 33 hours of course work includes two courses from each of the four groups listed below. The remaining courses are selected in consultation with the advisor. All students must pass a Master's Comprehensive Examination.

**Group I—Legislative Process:** PSc 218, 234

**Group II—Processes of Politics:** PSc 213, 215, 216, 219, 220, 221, 226, 227, 228, 246, 286

**Group III—Public Policy Analysis:** PSc 212, 224, 225, 249, 250; WStu 240

**Group IV—Legislative Research and Analysis:** PSc 201, 203

## MANAGEMENT SCIENCE

*Professors P.B. Vaill, J.B. Harvey, W.E. Halal, E.H. Forman, S.A. Umpleby, J.F. Lobuts, Jr., J.D. Frame, E.K. Winslow (Chair), J.H. Carson, N.M. Loeser (Emeritus), B. Burdetsky, P.W. Wirtz, J. Liebowitz*

*Associate Professors J.P. Coyne, L.E. Graff, T.J. Nagy, W.G. Wells, Jr., R.G. Donnelly, R. Soyer, P.B. Malone III, C.N. Toftoy, P.M. Swiercz, D.J. Cohen, P.P. Sanchez*

*Assistant Professors M. Granger, J. Artz*

See the School of Business and Public Management for programs of study leading to the degrees of Master of Business Administration, Master of Science in Information Systems Technology, and Doctor of Philosophy.

- 201 **Organization and Management (3)** Vaill, Halal  
For designated students in the M.B.A. program. Integrative approach to organizational concepts, management principles, philosophy, and theory in public and private organizations. Evolution of management thought, functions, and practices, stressing present management approaches. (Fall, spring, and summer)
- 202 **Management of Strategic Issues (3)** Halal, Adams  
The body of management theory and practice that has evolved recently to identify, analyze, and resolve strategic organizational issues. A survey of the methodology of the field; applications to critical issues in labor relations, energy and pollution, marketing and consumerism, business-government relations, and the global economy. Prerequisite: Mgt 201 or equivalent. (Spring and summer)
- 203 **Strategic Planning (3)** Halal  
Formulation of strategies that enable organizations to adapt to changing social, technological, economic, and political conditions. Lectures, discussion, and exercises examine strategic planning practices and the environmental changes affecting corporations, government agencies, hospitals, and other major institutions. Students conduct a strategic planning project for an organization. (Fall)
- 204 **Human Resources Management (3)** Malone, Toftoy, Cohen, Swiercz  
Survey of personnel management practices and procedures, including labor-management relations. Same as PAd 231. (Fall and spring)
- 205 **Seminar: Human Resources Management from the General Manager's Perspective (3)** Burdetsky, Lovell  
Readings and cases on critical issues and strategic questions concerning managing employees. (Spring)
- 206 **Global Human Resources Management (3)** Malone, Swiercz  
Human resources management in multinational corporations; strategic human resources management; the role of the human resources executive in the development of an organizational culture. Prerequisite: Mgt 204 or permission of instructor. Same as PAd 232. (Spring and summer)

- 207 Leadership and Executive Development (3)** Malone, Cohen  
Theories of managerial leadership: issues and problems associated with leadership in large organizations and at higher management levels: executive selection and development. Prerequisite: Mgt 201 or permission of instructor. (Fall and spring)
- 208 Unionism and Collective Bargaining (3)** Burdetsky, Lovell, Swiercz  
The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements. (Fall)
- 209 Current Issues in Unionism, Collective Bargaining, and Labor Relations (3)** Burdetsky, Lovell, Swiercz  
Research and analysis in selected contemporary issues regarding public policy, management, and organized labor. (Spring)
- 210 Individual and Group Dynamics in Organizations (3)** Harvey, Winslow, Vaill, Lobuts  
For graduate students who wish to improve their skills in dealing with human behavior in organizations. The course is designed to improve theoretical and personal understanding of the roles of interpersonal and group dynamics in management. Focus on individual and group behavior in various organizational settings. (Fall, spring, and summer)
- 211 Current Issues in Organizational Behavior (3)** Winslow, Lobuts  
Study of behavioral factors relating to issues such as automation, ethics, interpersonal relations, organizational change, and similar problems in organizational settings. Problems of conducting behavioral science research in organizations. (Fall)
- 212 Behavioral Factors in the Process of Change (3)** Harvey, Winslow  
Review of research, theory, and practice related to the process of human change. Students are provided the opportunity to apply their learning, using various media. This course emphasizes the relationship between theory and practice. (Fall, spring, and summer)
- 213 Organization Development: A Management Function (3)** Lobuts, Harvey, Vaill  
An exploration of the literature, culture, values, and skills that can assist a manager, leader, or administrator in carrying out the process of organizational development. Emphasis is on direct managerial intervention, although the role of consultants/facilitators in the process is explored. (Fall)
- 214 Behavioral Factors in Management Consulting (3)** Harvey, Vaill, Lobuts, Winslow  
Theories and methods of planning, introducing, and coping with change in management through the helping process. Intended both for managers seeking an understanding of the consultative approach to planned change and for persons in staff or consultative roles seeking understanding of the consultative process. (Spring)
- 215 Conflict Management: Theory, Concepts, and Methods (3)** Lobuts, Harvey, Winslow  
Exploration of various approaches to the causes of conflict and its resolution. Students study and experience ways to make conflict a creative rather than a destructive experience. Methods of conflict resolution are practiced. Conflict in the micro (person-to-person) and macro (system-to-system) levels are explored. Prerequisite: Mgt 210 or permission of instructor. (Fall and spring)
- 216 Cross-Cultural Management (3)** Vaill  
This course focuses on the variety of issues and opportunities that arise when managing outside one's own culture. The manager's credibility and effectiveness are assumed to be culture bound. Emphasis on the personal level as opposed to the interinstitutional or intercultural levels. Extensive use of student experiences and research. (Summer)
- 217 Entrepreneurship (3)** Winslow, Solomon  
In exploring the "entrepreneur as a phenomenon," students will be exposed to the theory and experiences associated with entrepreneurs, entrepreneurial acts, and entrepreneurship in all organizational settings—large, small, public, and private. (Fall and spring)



- 218 Computer Applications in Production/Operations Management (3)** Forman, Graff, Soyer  
For designated students in the M.B.A. program. Fundamentals of production/operations management. Inventory management, resource allocation, production planning, project management, and forecasting. Linear programming, queuing analysis, spreadsheets, database systems, BASIC. Principles, terminology, and organization of computer systems. Prerequisite or corequisite: Mgt 270. (Fall, spring, and summer)
- 219 Human Behavior and Human Resources Management** Burdetsky, Infeld  
**In Health Services Organization (3)**  
The theory and application of human behavior, human resources management, and labor relations policies, concepts, and practices as they impact on health services organizations. The primary focus is on the management of people at work and on the development of management skills. Same as HSMP 219. (Fall, spring, and summer)
- 220 Analytical Models for Decision Making (3)** Forman, Soyer  
Survey of analytical models used for decision making. Topics cover both probabilistic and deterministic models and include linear and integer programming, decision theory, utility theory, multicriteria decision analysis. Applications from literature are presented. Prerequisite: Mgt 218 and 270 or equivalent. (Fall and spring)
- 224 Foundations of Decision Making (3)** Forman, Soyer  
Concepts and methods for making complex decisions in both business and government; identifying criteria and alternatives, setting priorities, allocating resources, strategic planning, resolving conflict, and making group decisions. (Fall and spring)
- 225 Statistical Modeling and Analysis (3)** Wirtz, Graff, Forman, Soyer  
The process of specifying, analyzing, and testing models of human and systemic behavior. Formalization of models; statistical test comparison and selection; computer implementation of univariate, bivariate, and multivariate tests. General linear model: linear regression, analysis of variance, and analysis of covariance. Prerequisite: Mgt 270 or equivalent. (Fall and spring)
- 226 Workshop in Computerized Decision Systems (3)** Graff, Forman  
Framework, processes, and technical components for building decision support systems dealing with unstructured and underspecified problems from managerial and organizational perspectives. Construction and exploration of decision support system models. Prerequisite: Mgt 220 or permission of instructor. (Spring)
- 229 Decision Making in Practice (3)** Forman, Soyer  
Problem identification, design, evaluation, and choice of decisions in public, private, and nonprofit sectors. Prerequisite: Mgt 220, 224, and 225 or permission of instructor. (Alternate years)
- 230 Management of Technology Innovation (3)** Donnelly, Wells  
Competitive, economic, and political factors that influence technology innovation in public and private organizations, domestically and internationally. Management of research and development: project selection, resource allocation, technology planning, management of development projects. Quality, manufacturing, and intellectual property issues. Corporate venture divisions. (Fall and spring)
- 231 Project Management (3)** Wells, Frame  
Practical examination of how projects can be managed from start to finish, including specific emphasis on planning and controlling to avoid common pitfalls. Identifying needs, defining requirements, project costing, scheduling, resource allocation, and project politics. Configuration management; micro-computer applications. (Fall, spring, and summer)
- 232 International Science and Technology (3)** Frame, Wells  
Technology transfer among advanced countries and LDCs. Comparative science and technology policies and capabilities of countries. Technology basis for international trade, licensing, patenting, and joint ventures. Global transfer of military technologies and export controls. Technology in economic development. (Fall, spring, and summer)

- 233 Emerging Technologies (3)** Halal, Frame  
Exploration of new developments in scientific and technological innovation, including automation, energy, medicine, bioengineering, social science, information technology, and space. Emphasis on forecasting these technological advances and assessing their economic and social effects. The role of advancing technology in driving social change. (Spring)
- 235 Technology Entrepreneurship and Innovation (3)** Donnelly, Frame  
The process of innovation and entrepreneurship used to launch and build new ventures. Organizing for innovation, raising venture capital, tax considerations, managing the small technology-based venture, marketing technology. Case studies of recent low- to high-tech ventures. Developing a business plan for a technology-based venture. (Spring and summer)
- 239 Seminar: Competitiveness and Technology (3)** Donnelly, Wells  
Capstone course integrating the field of management of science, technology, and innovation. Commercialization of technology in the private sector and the impact on competitiveness. Implementation of technology in the public sector. Technology development, from new product concept to utilization. A major simulation. Prerequisite: 6 credits in related subjects or permission of instructor. (Fall)
- 240 Survey of Information Technology (3)** Artz, Carson, Liebowitz, Coyne  
Management-oriented survey of key areas in information technology, including hardware, software, systems development, management, and the computing milieu. Prerequisite: Mgt 218 or permission of instructor. (Fall, spring, and summer)
- 242 Systems Analysis for Information Systems (3)** Carson, Liebowitz, Coyne, Artz  
Development of a specification for an information system. Topics include CASE tools, data gathering, information flow modeling, object-oriented analysis, data file organization, input/output and other nonfunctional requirements, such as performance reliability, environmental conditions, and training. Prerequisite: Mgt 240. (Fall and spring)
- 243 Human Factors in Information Systems (3)** Nagy, Coyne  
The user-computer interaction, human factors of on-line dialogues, interfacing, and various approaches to user-system interaction. Emphasis on the development and evaluation of user-computer interfaces using artificial intelligence software. Prerequisite: Mgt 240. (Fall and spring)
- 244 Telecommunications: Technology, Applications, and Operations (3)** Carson, Artz  
Basic technical concepts, applications, and trends of telecommunications; operations; cost considerations of implementing telecommunications systems. Prerequisite: Mgt 240. (Fall and spring)
- 245 Database Management for Information Systems (3)** Coyne  
Theory, architecture, and implementation of database management systems in corporate and organization information systems. Designing databases for business applications and implementing such databases using commercially available packages. Prerequisite: Mgt 240. (Fall and spring)
- 249 Seminar in Hypermedia Information Systems (3)** Coyne, Graff  
Current trends in the design and implementation of hypermedia information systems. Integration of database, text, image, voice, video, and knowledge in information systems. (Fall and spring)
- 253 Information Security Systems (3)** Staff  
An advanced course in information technology, emphasizing the philosophies, principles, and practices of security management in and impact of privacy legislation on computer-based systems. Risk assessment, state-of-the-art measures, trends in the information security field, and roles of the various levels of management and technological staff. Prerequisite: Mgt 218 or 240. (Spring)
- 255 Applied Expert Systems (3)** Nagy, Liebowitz  
Students build an expert system that performs monitoring, diagnosis, classification, scheduling, planning, etc., and tolerates incomplete or inexact inputs. Prerequisite: Mgt 240 or permission of instructor. (Fall, spring, and summer)
- 261 Introduction to Systems Theory and Cybernetics (3)** Umpleby  
Systems theory and cybernetics provide principles that govern information processing and decision-making activities, whether these occur in human



- beings, machines, or social organizations. The course covers ways of conceptualizing systems, strategies for regulating systems, and paradoxes involved in self-regulation. (Fall)
- 262 Methods for Making Organizations Adaptive (3)** Umpleby  
An adaptive organization must solve day-to-day problems and periodically restructure itself to meet new challenges and opportunities. The course reviews several strategies for conducting a group planning process and introduces several models of ideal organizations. Students conduct an interactive planning process with people in an organization. (Spring)
- 264 System Dynamics Modeling (3)** Umpleby  
Computer modeling of organizational problems using system dynamics and the dynamo programming language. Review of previous applications of system dynamics. Causal influence diagrams, level and rate diagrams, equations, testing, and analysis. In conjunction with people in an organization, students develop a system dynamics model of some aspect of the organization. (Fall)
- 265 Artificial Intelligence and Cybernetics (3)** Umpleby  
Artificial intelligence entails building computers that simulate human behavior. Cybernetics provides a theory of cognition that can aid designing software and assessing implications of new computer technology for individuals and organizations. Theoretical and philosophical literature on the prospects for automating intelligent behavior. (Spring)
- 270 Mathematics and Statistics for Management (3)** Forman, Graff, Wirtz, Soyer  
For designated students in the M.B.A. program. Mathematical and statistical concepts employed in the solution of managerial problems. Applications of functions, elements of calculus and linear algebra. Introduction to probability, frequency distributions, statistical inference, and regression and correlation. (Fall, spring, and summer)
- 275 Advanced Statistical Modeling and Analysis (3)** Wirtz  
Advanced topics associated with the general linear model. Testing for and remediation of assumption violations. Detection of outliers, influential observations, and multicollinearity. Alternative design strategies in the analysis of variance; a priori and a posteriori tests; testing for interactions and parallelism. Prerequisite: Mgt 225 or permission of instructor. (Fall and spring)
- 276 Exploratory and Multivariate Data Analysis (3)** Wirtz  
Methods for exploratory data analysis. Application and comparison of advanced multivariate analytical procedures. Multivariate and discriminant analysis, canonical correlation, and maximum likelihood latent structure analysis. Prerequisite: Mgt 225 or permission of instructor. (Spring)
- 277 Applied Forecasting and Time-Series Analysis for Managers (3)** Soyer  
Introduction to various forecasting techniques, including time-series regression models, cyclical trends, exponential smoothing methods, seasonal and non-seasonal ARIMA processes, and the Box-Jenkins approach. Application of forecasting methods in economics, finance, and marketing. (Fall and spring)
- 280 Information Systems Development and Applications (3)** Carson, Coyne  
Each stage of the information systems life cycle is discussed in terms of technologies, impact, and management. Topics include structured analysis, prototyping, software reuse, testing, life-cycle costs, software development environments, organizational and behavioral aspects of development projects. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall and spring)
- 281 Foundations of Artificial Intelligence (3)** Wirtz, Nagy, Liebowitz, Coyne  
Logical foundations, components, and processes of automated reasoning systems. Alternative inference rules. Introduction to predicate calculus, recursion, and lists. Students use the computer to solve problems in an artificial intelligence language. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall)
- 282 Telecommunications and Enterprise Networks (3)** Carson, Artz  
Telecommunications and networking as applied to enterprises in the commercial and public sector. A survey of the technologies and applications of telecommunications systems. Emphasis on selection of the proper technologies and configurations necessary to support business applications. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall and spring)

- 283 Topics in Higher-Level Languages (3)** Carson, Nagy  
Emerging high-level languages, such as PROLOG, SMALLTALK, C, and C++, used to develop information systems. Not all languages are offered every semester; programming assignments are made in the languages studied. May be repeated once with advisor's approval. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall and spring)
- 284 Database Systems (3)** Coyne  
Use of the latest techniques for developing and implementing an effective database system. Topics include database organization, creation, and maintenance; evaluation criteria; standardization of database systems; and analysis of the state of the art in database development. Prerequisite: M.S. in I.S.T. degree candidacy or department approval. (Fall and spring)
- 285 Database and Expert Systems (3)** Coyne  
Analysis and solution of complex information problems through commercially available database and expert systems; development of evaluation methodology, comparison of implementation strategies. Hands-on experience with major commercial systems. Prerequisite: M.S. in I.S.T. degree candidacy; Mgt 284 department approval. (Fall and spring)
- 286 Comparative Operating Systems (3)** Artz, Carson  
Survey of operating systems and related technologies. Emphasis on aspects of operating systems, such as security, file structures, scheduling, and interprocess communication that affects the design of information systems. The Unix, OS/2, VM/CMS, and VAX/VMS systems are presented. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall)
- 287 Design of On-Line Information Systems (3)** Carson  
Analysis, design, and implementation of on-line information systems. Topics include systems analysis, database design, dialog design, response time and reliability calculations, system testing, and project planning. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Fall and spring)
- 288 Applied Artificial Intelligence Programming (3)** Nagy, Wirtz, Liebowitz  
Use of programming methods and knowledge representations originating in artificial intelligence (e.g., executable specifications, rules, frames, objects, neural networks) to develop systems. Prerequisite: M.S. in I.S.T. candidacy or department approval. (Spring)
- 290 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 291 Knowledge Acquisition (3)** Coyne, Liebowitz, Nagy, Wirtz  
Knowledge acquisition is often the biggest problem in expert systems development. The ability to acquire knowledge from the expert requires both technical and interpersonal skills. This course is aimed at explaining some of the barriers to acquiring knowledge and discusses techniques to overcome them. Prerequisite: Mgt 281 or permission of instructor. (Fall)
- 292 Special Topics in Applied Artificial Intelligence and Neural Networks (3)** Liebowitz, Coyne, Nagy, Wirtz, Carson  
Topics include neural networks, machine learning, speech understanding, parallel processing, object-oriented programming, and knowledge representation. Prerequisite: Mgt 281 and 288 or permission of instructor. (Spring)
- 298 Directed Readings and Research (3)** Staff
- 299 Thesis Seminar (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311.
- 328 Seminar: Operations Research (3)** Staff  
Special topics and advanced applications in operations research, such as catastrophe theory, Markovian decision processes, or applications of the calculus of variation in economics and finance. May be repeated once for credit.
- 382 Seminar: Historical Foundations of Organizational Behavior and Development (3)** Harvey, Lobuts, Vaill, Winslow  
The historical roots of the field of organizational behavior and development, with an emphasis on individuals and institutions central to the field's growth. Students read about, meet with, and discuss the work of persons central to the development of the field. Prerequisite: Doctoral candidate status with organiza-



- tional behavior and development as a major or supporting field, or consent of instructor. (Spring, alternate years)
- 385 **Special Topics in Research Methods** (3) Wirtz, Harrell  
Research problems and issues related to student dissertations form topics for readings, group discussions, and assigned papers. (Fall and spring)
- 386 **Seminar: Organizational Behavior and Development** Harvey, Lobuts, Vaill, Winslow  
**Ideas in Progress** (3)  
The course enables doctoral students to work with a variety of faculty members as they develop new ideas, research projects, and engage in seminal inquiry. The content and structure of the course will depend upon the instructor. Prerequisite: Doctoral candidate status with organizational behavior and development as a major or supporting field, or consent of instructor. (Fall and spring)
- 390 **Philosophical Foundations of Administrative Research** (3) Vaill  
Philosophy of science as applied to research in administration. Topics include the nature and current problems of epistemology, the development and role of theories, and the relationship between theory, methodology, and empirical data. (Fall and spring)
- 391 **Advanced Problems of Research Methodology** (3) Wirtz, Newcomer, Harrell  
Examination of the process of social science research. Use of models and theoretical frameworks in research; formulation of research questions, hypotheses, operational definitions, research design, sampling methods, and data analysis approaches. Primary emphasis on the development of dissertation proposals. (Fall and spring)
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to doctoral candidates. May be repeated for credit.

#### MARKETING, LOGISTICS, AND OPERATIONS MANAGEMENT

Professors S.F. Divita (Chair), R.F. Dyer, S.N. Sherman, J.H. Perry  
Associate Professors M.L. Liebrez-Himes, L.M. Maddox, P.K. Bagchi, P.A. Rau, R.S. Achrol  
Assistant Professors S.S. Hassan, L.N. Birou

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.

- 240 **Marketing Management** (3) Dyer, Divita, Liebrez-Himes, Hassan, Maddox, Rau, Achrol  
This course is a First-Level requirement for M.B.A. students; it may not be used to satisfy a Second-Level requirement. Emphasis on the marketing process from the viewpoint of the firm. Market analysis, product planning, channels of distribution, pricing, and promotional decision making; developing an integrated marketing plan. Prerequisite: Econ 217-18. (Fall, spring, and summer)
- 241 **Advanced Marketing Management** (3) Divita, Liebrez-Himes, Rau  
For M.B.A. students in concentrations other than marketing. Case analysis of marketing problems. Current developments in marketing practice. The relationship of marketing to environmental forces and other business functions. Prerequisite: MLOM 240. (Fall and spring)
- 242 **Buyer Behavior** (3) Dyer, Hassan, Maddox  
A required course for marketing students. The buyer decision process model as a framework for analysis of how and why products and services are purchased and used. The impact of consumer decisions on the marketing strategies of organizations. Marketing applications in high-tech and service industries. Prerequisite: MLOM 240. (Fall and summer)
- 243 **Marketing Research** (3) Dyer, Rau  
The marketing research process: designing, conducting, and using market research studies. Managing the market research project; qualitative research; survey and experimental designs; data analysis with statistical software packages. Prerequisite: MLOM 240, Mgt 218 and 270 (Fall, spring, and summer)

- 246 Marketing of Services (3)** Liebrez-Himes  
Management of the activities involved in marketing new and existing services. The innovation system (behavioral and organizational) of service product decisions, product planning processes, marketing auditing, services and the law, and new service trends. Marketing of intangibles and services is highlighted. Prerequisite: MLOM 240. (Spring)
- 248 Advertising and Sales Promotion (3)** Maddox  
Examination of advertising and sales promotion from a systems perspective supported by analytical methods and concepts regarding consumer attitudes and behavior. The role of communication in marketing, behavioral research, message design, economic and financial criteria, development of a promotion program. Prerequisite: MLOM 242. (Spring and summer)
- 250 Selling and Sales Management (3)** Divita  
The selling task, with attention to ethical and legal issues, the selling process, account management, negotiation. Managerial issues, demand analysis and resource allocation, financial planning, quota setting and control, motivation, coaching and incentives, sales administration, and analysis of sales performance. Prerequisite: MLOM 240. (Fall and spring)
- 253 Marketing Channels (3)** Achrol  
Marketing channels as super-organizations: planning, organization, coordination, and control. The channel's task environment: manufacturing, wholesaling, retailing, and physical distribution institutions. System performance and management of interorganizational relationships among channel institutions. Prerequisite: MLOM 240. (Fall)
- 255 Marketing High Technology (3)** Divita  
Emphasis on differentiating the marketing process used for marketing high technology and high technology products from that employed by firms offering a standard product line. Market analysis, product planning, channels of distribution, pricing, promotion, decision making, and developing an integrated marketing plan. Primarily for M.S. in I.S.T. students.
- 257 Marketing and Public Policy (3)** Divita  
Examination of principal areas of public policy formulation affecting marketing practice. Topics: advertising, warranties, product safety, health issues, consumer information systems, informal and formal redress mechanisms, business responsibilities. Government, business, and advocate viewpoints presented. Prerequisite: MLOM 240 or permission of instructor. (Fall)
- 259 Marketing Strategy (3)** Divita, Rau  
Required capstone course for marketing students. Analysis of complex marketing problems involving policy and operational decisions; emphasis on creative marketing strategy. Prerequisite: completion of at least three Second-Level marketing courses, excluding MLOM 241. (Spring)
- 280 Purchasing and Materials Management (3)** Birou, Sherman, Bagchi  
Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics. Same as PAD 280. (Fall and spring)
- 281 Procurement and Contracting (3)** Sherman  
Principles and concepts essential to effecting large procurement programs. Planning, sourcing, and contractual design for diverse acquisitions. Emphasis on federal government policy with comparison of buying at other governmental levels and the private sector. Same as PAD 281. (Fall and spring)
- 282 Government Contract Administration (3)** Sherman  
Surveillance and management of contract performance. Measurement of progress; specification interpretation; quality assurance; changes, negotiation, and adjustment; financial considerations; property; terminations; regulatory and policy concerns. Same as PAD 282. (Spring)
- 283 Pricing and Negotiation (3)** Sherman  
Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Same as PAD 283.



- 285 Systems Procurement and Project Management (3)** Perry, Sherman  
Major systems acquisition: needs, objectives, organizational relationships, and systems engineering concepts. Design, establishment, and execution of project management plans and procurement processes. Analysis of cases in public- and private-sector contracting. Same as PAd 285. (Fall and spring)
- 286 Physical Distribution Management (3)** Bagchi  
Transportation and communications services management; optimization of cost and service. Alternatives available to the manager, given the economic situation, competitive conditions, and regulatory environment of the several transportation modes. Model location theory and distribution network planning and design. Prerequisite: MLOM 288. (Spring)
- 287 Manufacturing Control Systems (3)** Bagchi, Perry  
Inventory and production control concepts, techniques, and strategies for effective integration with basic finance, marketing, and manufacturing objectives. Forecasting methods, material requirements planning systems, distribution requirements planning techniques, and classical reorder-point inventory models. (Fall)
- 288 Logistics Management (3)** Bagchi, Perry  
Management of work in production, commercial, service, and public organizations. Analytical tools for planning and establishing operating systems and for their operation, control, and modification. Examination of processes, products, services, equipment, and facilities. Relationships of human systems and operating systems. (Fall)
- 289 Manufacturing Strategy (3)** Bagchi, Perry  
Basic production methods and techniques that influence formulation of a firm's strategic policy. Traditional and updated and improved systems for controlling capacity and output. Examination of productivity analysis, cost control, materials planning, and other topics to ensure that the production function contributes to overall profit. (Spring)
- 290 Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 298 Directed Readings and Research (3)** Staff
- 299 Thesis Seminar (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311.
- 341 Seminar: Marketing (3)** Dyer, Liebrezn-Himes, Rau  
Examination of major theoretical developments in marketing. Open only to doctoral candidates.
- 381 Seminar: Materials and Operations Management (3)** Bagchi, Perry, Sherman  
Recent developments in manufacturing production and materials management; impact of technological economic and social change; significant related trends. Private- and public-sector policy implications. New and emerging analysis techniques. Open only to doctoral students.
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to doctoral candidates. May be repeated for credit.

## MATHEMATICS

Professors I. Katz (Chair), H.D. Junghenn, I.I. Glick, M.M. Gupta  
Associate Professors M.P. Lee, E.A. Stone, E.A. Robinson, R. Simion, F.E. Baginski, D.H. Ullman  
Assistant Professors V. Harizanov, K.G. Hockett, J. Bonin, M. Moses, Y. Rong

*Master of Arts in the field of mathematics*—Prerequisite: a bachelor's degree with a major in mathematics from this University, or an equivalent degree.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Students must complete 30 credit hours of approved course work, with or without a thesis, and must pass a comprehensive examination.

*Master of Arts or Master of Science in the field of applied mathematics*—Prerequisite: a bachelor's degree with a major in mathematics or a related field such as statistics, a physical science, engineering, or economics.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Course work is divided between mathematics courses and courses from one area of application—economics, engineering (civil, electrical, or mechanical engineering; operations research; or engineering management), physics, statistics, or urban and regional planning. Courses in the chosen area of application are selected in consultation with the relevant department.

Candidates for the degree of Master of Arts or Master of Science in the field of applied mathematics must complete 30 credit hours of approved course work and must pass a comprehensive examination. At least 15 credit hours must be in mathematics courses, with no more than 6 hours of these from approved 100-level courses. The remaining courses are chosen from the selected area of application. Theses are jointly supervised by the Department of Mathematics and the department concerned with the area of application. There is no thesis requirement.

*Doctor of Philosophy in the field of mathematics*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The department doctoral program committee, after consultation with the student, will stipulate (1) courses that must be taken to fulfill the 48-credit-hour requirement leading to the General Examination; (2) the two languages, selected from French, German, or Russian, to satisfy the foreign language requirement; and (3) the four areas of study in which the student must prepare for the General Examination. The doctoral program committee will appoint a Director of Research when the student has selected (preferably early in the program) one of the following research fields for the dissertation: functional analysis (abstract differential equations, generalized functions, groups of operators), group representations, linear algebra (matrix theory), logic, theory of computability, measure and integration, numerical analysis, ordinary and partial differential equations, combinatorics, graph theory, ergodic theory, dynamical systems, semigroups, and topology (general topology, analytic topology, topological groups).

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

**201-2 Modern Algebra I-II (3-3)**

Katz

Group theory including symmetric groups, free abelian groups, finitely generated abelian groups, Sylow theorems, solvable groups, nilpotent groups. Ring theory including factorization in commutative rings, rings of polynomials and formal power series, chain conditions, semisimple rings, Wedderburn-Artin theorems, primary decomposition, Dedekind domains. (Academic year)

**203 Modern Algebra III (3)**

Katz

Algebraic and transcendental field extensions, splitting fields, normal extensions, fundamental theorem of Galois theory, solvability by radicals, valuation theory. (Fall, odd years)

**204 Representation Theory (3)**

Lee

Representations of finite groups, including symmetric group, group characters, and induced representations. Prerequisite: Math 202. (Fall)

**205 Matrix Theory (3)**

Katz

Topics to be chosen from generalized inverses of matrices and their applications to solutions of equations and to LP problems; positive definite matrices and their applications; Riemann matrices; linear groups; quadratic forms and Hilbert's eleventh problem; numerical range of linear operators. (Spring, even years)

**209-10 Theoretical Methods in Classical and Quantum Physics (3-3)**

Staff

Joint offering of the Mathematics and Physics Departments. Topics covered include solutions of partial differential equations encountered in physics; techniques of linear algebra; calculus of variations; complex analysis; applications in physics of the theory of analytic functions; integral equations; and group theory in physics.

**211 Complex Analysis I (3)**

Glick and Staff

Topology of complex numbers; elementary functions; integrals; Cauchy's theorem; maximum modulus and Liouville theorem; Taylor and Laurent series;



- classification of singularities; contour integration; the residue theorem; analytic continuation, multivalued functions, and branch points. Prerequisite: advanced calculus. (Spring)
- 212 **Complex Analysis II (3)** Glick and Staff  
Harmonic functions, partial fractions. Mittag-Leffler theorem; entire functions, the Hadamard product theorem, the gamma function; Hurwitz's theorem, normal families of functions. The Riemann mapping theorem; analytic continuation, Riemann surfaces. Prerequisite: Math 211 or equivalent. (Offered when demand warrants)
- 214 **Measure and Integration Theory (3)** Ullman and Staff  
Lebesgue measure and integration in abstract spaces. Probability measures. Absolute continuity; Radon-Nikodym theorem; measure on product spaces; Fubini theorem.  $L^p$  spaces. Prerequisite: advanced calculus. (Fall)
- 215 **Introduction to Functional Analysis (3)** Robinson and Staff  
Topological and metric spaces; Tychonoff theorem; Banach spaces; linear functionals and operators; Hahn-Banach closed-graph and open-mapping theorems; uniform boundedness; Hilbert spaces; eigenvalues, projections. Prerequisite: advanced calculus. (Spring)
- 216 **Banach Algebras and Spectral Theory of Operators (3)** Robinson  
Gelfand theory of commutative Banach algebras; function algebras, Stone-Cech compactification; application to the spectral theory of operators, spectral theorem for bounded and unbounded operators. Prerequisite: knowledge of measure and integration, introduction to functional analysis, and Tychonoff and Stone-Weierstrass theorem. (Fall, odd years, when demand warrants)
- 217 **Introduction to Ordinary Differential Equations (3)** Glick  
First course in ordinary differential equations; existence and uniqueness of solutions; continuity of solutions with respect to initial conditions; properties of linear systems. Prerequisite: advanced calculus. (Spring)
- 218 **Topics in Ordinary Differential Equations (3)** Staff  
Topics selected from stability theory, nonlinear oscillations, bifurcation theory, functional differential equations. Prerequisite: Some background in ordinary differential equations and permission of the instructor. (Spring)
- 219 **Partial Differential Equations (3)** Staff  
Classical and modern techniques for the exact and approximate solution of PDEs. Separation of variables, Green's functions, variational methods, Hilbert space methods. Prerequisite: advanced calculus. (Spring)
- 221 **Calculus of Variations (3)** Glick  
Conditions for an extremum, Euler differential equations, variational problems for multiple integrals, variable endpoint problems, and applications to physics, control theory, and geometry. Prerequisite: Math 140 or permission of instructor. (Spring)
- 222 **Introduction to Numerical Analysis (3)** Gupta  
Computer arithmetic and round-off errors. Solution of linear systems and nonlinear equations. Interpolation and approximations. Numerical differentiation and integration. Eigenvalues and eigenvectors. Prerequisite: Math 33 and computer programming. (Fall)
- 223 **Numerical Solution of Ordinary and Partial Differential Equations (3)** Gupta and Staff  
Initial and boundary value problems for ordinary differential equations. Error propagation, convergence and stability. Finite difference and finite element methods for partial differential equations. Prerequisite: knowledge of differential equations and computer programming. (Spring, alternate years)
- 224 **Generalized Functions and Integral Transforms (3)** Staff  
Laplace and Fourier transforms. Generalized functions. Green's functions. Applications to ordinary and partial differential equations. Prerequisite: Math 157 or equivalent.
- 225 **Ergodic Theory (3)** Robinson, Hockett, Ullman  
Ergodicity, mixing, the K-property and the Bernoulli property. Poincaré recurrence, the Rohlin lemma, the ergodic theorem and entropy theory. Additional topics from isomorphism theory, spectral theory, the theory of joinings and coding theory. Prerequisite: Math 214 or permission of instructor.

- 226 Dynamical Systems and Chaos (3)** Hockett, Robinson  
Linear and nonlinear systems, flows, Poincaré maps, structural stability. Examples of chaotic systems in the physical sciences. Local bifurcations, center manifold theory, normal forms, the averaging theorem. Hyperbolic invariant sets, strange attractors, the Smale horseshoe, symbolic dynamics. Prerequisite: Math 140 and 124 or permission of instructor.
- 230 Topics in Analysis (3)** Staff  
Possible topics include, but are not limited to, ergodic theory, dynamical systems, topological groups, topological vector spaces, generalized functions and distributions. May be repeated for credit.
- 231 Topics in Applied Mathematics (3)** Staff  
Possible topics include, but are not limited to, applications of functional analysis to nonlinear differential equations, calculus of variations, control theory, mathematical programming, applied mathematics for scientists and engineers. May be repeated for credit.
- 232 Topics in Numerical Analysis (3)** Gupta and Staff  
Numerical methods and software. Introduction to the methods, tools, and ideas of numerical computation. Problem solving using standard mathematical software, such as IMSL and LINPACK. Interpolation: linear, nonlinear, and differential equations. Prerequisite: matrix theory, differential equations, and FORTRAN programming. (Spring, alternate years)
- 241-42 Mathematical Foundations of Stochastic Processes (3-3)** Junghenn  
A mathematically rigorous study of conditional probability and expectation, martingales, stopping times, Brownian motion, and Markov processes. Prerequisite: Math 214 or the equivalent.
- 261 Combinatorics (3)** Simion  
Partially ordered sets, constructive combinatorics, tableaux, partitions. Prerequisite: Math 113, undergraduate modern algebra and linear algebra, or permission of instructor. (Spring)
- 262 Graph Theory (3)** Simion  
Graphical enumeration, factors, algebraic graph theory, extremal graph theory, problems ranging from classical results to current research, applications. Prerequisite: Math 113, linear algebra, modern algebra, or permission of instructor. (Fall)
- 263 Topics in Combinatorial Mathematics (3)** Staff  
May be repeated for credit.
- 271 Mathematical Logic (3)** Harizanov  
Model theory: the relation between a formal language (syntax) and its interpretations (semantics). Consistency, completeness, and compactness. Tarski's theorem on the inexpressibility of truth. Godel's incompleteness theorem and its impact on mathematics. (Fall, even years)
- 272 Topics in Logic (3)** Harizanov  
Topics selected from a broad spectrum of different areas of logic and applications, based on students' suggestions and interests. May be repeated for credit.
- 281-82 General Topology (3-3)** Stone and Staff  
General topological spaces, separation axioms, compactness, and connectedness. Metrization, uniform spaces, and complete spaces.
- 287 Differentiable Manifolds I (3)** Glink  
Differentiable manifolds, tangent vectors, submanifolds, imbeddings and immersions, vector fields and differential equations on manifolds, tensors and differential forms, Lie derivatives, orientability. (Fall, even years)
- 288 Differentiable Manifolds II (3)** Glink  
Manifolds with boundary, integration on manifolds, Stokes's theorem and the divergence theorem, the Brouwer fixed-point theorem, deRham groups, Riemannian manifolds, geodesics, curvature. (Spring, odd years, when demand warrants)
- 295 Reading and Research (arr.)** Staff  
May be repeated for credit.
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.



**399 Dissertation Research (arr.)**

Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit.

**MECHANICAL ENGINEERING**

See Civil, Mechanical, and Environmental Engineering.

**MICROBIOLOGY AND IMMUNOLOGY**

Professors L.F. Affronti (Chair), M. Reich, P.D. Kind, J.W. Albright, D.T. Kingsbury  
Associate Professor G.V. Stokes

*Master of Science in the field of microbiology*—Prerequisite: a bachelor's degree with a major in biological or physical sciences from this University, or an equivalent degree. The undergraduate program must have included the following courses or equivalent: BiSc 11–12; Chem 11–12, 151–52, 153–54; Math 30, 31 (31 may be taken concurrently with the graduate program); Phys 1, 2.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. A total of 30 credit hours is required, 24 hours of course work and 6 hours of thesis (Micr 299–300). The course work must include Bioc 221–22 and Micr 277–78. The remaining academic work should consist of graduate-level courses selected with the approval of the department.

*Doctor of Philosophy in the field of microbiology*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The General Examination covers at least four fields, two of which must be in microbiological disciplines.

*Research fields:* immunology, pathogenic microbiology (including subdisciplines of bacteriology, parasitology, and mycology), and molecular and cellular biology (including virology, microbial physiology, and genetics).

- 212 Pathogenic Bacteriology (3)** Staff  
Lecture course, with focus on the molecular events of the host–pathogen relationship. (Spring)
- 225 Microbial Physiology I (3)** Reich, De Giovanni-Donnelly  
Microbial structure, nutrition, transport, growth, genetics, metabolism, and regulatory mechanisms. Prerequisite: Bioc 221–22. (Fall)
- 226 Microbial Physiology II (3)** Reich, De Giovanni-Donnelly  
The actions of antimicrobial agents and antibiotics on the structure and biochemistry of microorganisms at the cellular and molecular level. Prerequisite: Micr 225 or permission of instructor. (Spring)
- 229 Immunology (3)** Kind, Affronti  
Lecture course. Fundamental immunologic concepts. Antigens, antibodies, antigen and antibody reactions *in vitro* and *in vivo*, and the immune response. Prerequisite: Bioc 221–22. (Fall)
- 233 Virology (3)** Stokes  
Biochemical, genetic, and pathogenic characterization of viruses. Prerequisite: Bioc 221–22 or permission of instructor. (Fall)
- 241 Survey of Molecular Biology Techniques (3)** Staff  
Laboratory course in the basic techniques of molecular biology as they apply to analysis and manipulation of proteins and nucleic acids. (Spring)
- 258 Microbial Genetics (2)** De Giovanni-Donnelly  
Survey of microbial systems that depict basic concepts of genetic principles. (Spring)
- 260 Cellular and Molecular Immunology (3)** Kind  
Advanced seminars in cellular and molecular immunology. Prerequisite: Micr 229. (Spring)
- 277–78 Seminar: Microbiology (1–1)** Staff  
Required of graduate students. (Academic year)
- 293 Special Topics (arr.)** Staff  
Selected topics in microbiology. May be repeated for credit. (Fall and spring)

- 294 **Research in Clinical Microbiology (3)** Staff  
Development and/or evaluation of techniques, procedures, or instrumentation related to clinical microbiology. Limited to students in the master's program in clinical microbiology. Offered jointly by the Microbiology and Pathology Departments.
- 295 **Research (arr.)** Staff  
Content differs each time the course is offered; may be repeated for credit. (Fall and spring)
- 299-300 **Thesis Research (3-3)** Staff
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## MUSEUM STUDIES

### Committee on Museum Studies

M.C. Malaro (Director), R.L. Humphrey, C.R. Rose, R.B. Stott, J. Vlach

Columbian College and Graduate School of Arts and Sciences offers an interdepartmental program leading to the degree of Master of Arts in the field of museum studies. The program is designed for those who seek a deepening of their primary academic interest along with training in the broad range of talents required in the successful operation of museums. The goal of the program is to produce graduates who are prepared to assume museum positions that require both scholarship and functional skills. (Students whose career interests are primarily curatorial should consider applying for the Master of Arts in their academic discipline with a concentration in museum training; those interested in museum education should refer to the Master of Arts in Teaching under the School of Education and Human Development.)

Students applying for candidacy in the Museum Studies Program must meet all general requirements for admission to the Graduate School. The student must have an undergraduate major, or its equivalent, relevant to the proposed academic core and at least 9 credit hours in a museum-related field other than the undergraduate major or must show equivalent preparation.

Courses relating to museum studies are offered by other departments of the University, such as Anthropology, American Studies, Art, Educational Leadership, and Theatre and Dance. With the approval of their advisor, students may draw on these courses in formulating their programs. A representative list of these courses appears at the end of this section.

The Committee on Museum Studies serves the Museum Studies Program in an advisory capacity. Its members are drawn from several departments of the University and from the Smithsonian Institution.

**Master of Arts in the field of museum studies**—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The degree requires a minimum of 42 hours of course work. At least 15 hours of course work must be in an academic core discipline, for example, American studies, anthropology, art, biological sciences, geology and paleobiology, history, or an appropriate interdisciplinary combination. At least 15 hours of course work must be in museum studies courses that concern such functions as museum administration, collections management, exhibiting, and object care and conservation. At least 6 hours must be in a museum internship in the Washington area or elsewhere. The student must pass a comprehensive examination based on course work and submit a research paper.

### 201 Introduction to Museum Studies:

P. Spiess

#### **History and Philosophy of Museums (3)**

Museums viewed from historical, philosophical, and practical perspectives. Examination and comparison of types of collecting organizations. Analysis of contemporary studies on the status of museums and their public programs. (Fall)

### 202 Introduction to Museum Studies: Administration (3)

Malaro

Overall operation of the museum: legal status of the museum and its obligations to the public; governance, staffing, policy-making as a nonprofit organization. Theory applied to practical situations. (Spring)



- 203 **Fiscal Management of Nonprofit Organizations** (3) Olmo  
Basic concepts of general accounting; fund accounting for nonprofit organizations; budgets and budget systems; use of the budget as a management tool; interest rates and risk analysis; other financial management concepts. (Spring)
- 215 **Collections Management: Legal and Ethical Issues** (3) Malaro  
Establishing collections policies; laws, regulations, conventions, and codes that affect acquisitions, deaccessions, loans, and collection care; accountability; access problems. (Fall)
- 216 **Collections Management: Practical Applications** (3) Perge  
The implementation of collections policies; establishing and managing collections, management procedures and systems, documentation of collections, records preservation, collections access and storage, handling, packing and shipping, and inventory control. (Spring)
- 270 **Museum Exhibition: Curatorial Research and Planning** (3) Bunch, Sims  
Museum research from a curatorial point of view, with emphasis on exhibit conceptualization and development. Research techniques, information sources, script production. (Fall)
- 271 **Museum Exhibition: Design Processes** (3) Sims, Volkert  
The processes of research, conceptualization, planning, and evaluation from a designer's point of view. Focus is on individual projects with some group collaboration. The designer's vocabulary, visual thinking, design documentation, and specifications. (Spring)
- 291 **Museum Internship** (1 to 6) Malaro  
Individual work experience in museums of the Washington area and possibly elsewhere. Each student should make arrangements with the Director of the Museum Studies Program. Museum internships are supervised by one or more members of the cooperating museum staff in the areas of museum management, object care and conservation, exhibiting. (Fall, spring, and summer)
- 295 **Directed Research** (3) Staff  
Individual research on special topics in the museum field. Topics must be approved by the Director of the Museum Studies Program. May be repeated for credit. (Fall, spring, and summer)
- 297 **Special Topics** (3) Staff  
May be repeated for credit provided the topic differs.

**Related courses offered by other departments:**

- AmCv 251 *Museum Research and Education*  
AmCv/Anth 294 *Field and Laboratory Research in Archaeology*  
Anth 264 *Seminar: Anthropological Museum Techniques*  
Art 209-10 *Exhibition and Display Design*  
Art/Anth 292 *Introduction to Conservation*  
Art/Anth 293 *Preventive Conservation Techniques*  
Art/Anth 212 *Advanced Conservation Techniques*  
Educ 223 *Museum Audiences*  
Educ 227 *Museum Evaluation*  
Educ 230 *Managing Computer Applications*  
Educ 240 *Proposal Writing*  
Educ/AmCv 286 *Interpretation in the Historic House Museum*  
TrDa 231 *Lighting Design*  
TrDa 233 *Architecture of Theatre and Exhibit Spaces*  
TrDa 234 *Scene Design: Renderings*  
TrDa 235 *Scene Design: Model Making*

**NATIONAL CENTER FOR COMMUNICATION STUDIES**

See *Communication Studies*.

**NEUROSCIENCE**

**Committee on Neuroscience**

M.J. Koering (Chair), J. Baumgold, G. Fiskum, S.A. Moody, T.W. Moody, D.C. Perry, K.D. Peusner, J.M. Rosenstein, L.A. Rothblat, R.J. Walsh, L.L. Werling

*Doctor of Philosophy in the field of neuroscience*—Prerequisite: A bachelor's degree in chemistry, biological sciences, or an approved related field.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The curriculum consists of 72 credit hours, including 12 to 24 hours of dissertation research. Course work must include Bioc 221–22, 280; Anat/Phyl 212; NeuS 291; Phar 203, 279; Psyc 251; Stat 127, Statistics for the Biological Sciences. Courses related to neuroscience that may be included in the program include Anat 204, 253, 260, 261; Bioc 250, 266; Micro 229; Path 203–4; Psyc 223, 281, 282. The general examination is taken in three fields: two fields selected from neurochemistry, neuroanatomy, behavioral neuroscience, and neuropharmacology; and one field selected from molecular biology, immunology, radiological science, neurophysiology, and neuropathology.

Research fields: cerebral ischemia, neural transplantation, molecular mechanism of action of drugs of abuse, neurotransmitter systems (excitatory amino acids, cholinergics, and catecholamines), cerebrospinal fluid and neuroendocrinology, developmental neurobiology, psychobiology of learning and memory.

**221 Neuroendocrinology (2)**

Basic principles of the central and autonomic nervous system functions and their interaction with and control over the endocrine system. Admission by permission of instructor.

**222 Neuroimmunology (2)**

The relation of the nervous system to immune function. Topics include cellular intercommunication involved in age-related phenomena, autoimmunity, and AIDS. Admission by permission of instructor.

**223 Developmental Neurobiology (2)**

Analytical approaches and major discoveries on molecular, cytological, and ultrastructural aspects of the developmental processes, including the study of cell lineages, pathway formation, cell–matrix interactions, and the emergence of cell–cell signaling.

**291 Neuroscience Internship (2)**

Limited to Ph.D. candidates in the neuroscience program. Rotation through selected laboratories during the first year of study.

**398 Advanced Reading and Research (arr.)**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.

**399 Dissertation Research (arr.)**

Limited to Doctor of Philosophy candidates. May be repeated for credit.

## OPERATIONS RESEARCH

Professors W.H. Marlow, D. Gross, N.D. Singpurwalla, A.V. Fiacco, G.P. McCormick, J.E.

Falk (Acting Chair), R.M. Soland

Adjunct Professors R.H. Clark, T.W. Kelly

Professorial Lecturers C. Anello, G.R. McNichols, D.R. Edmonds, J.F. Ince, S.E. Nevius,

H.L. Eskew, M.F. McGrath, L.B. Anderson, A. Greenland, N.J. Plotkin, R.S. Sheldon,

D.K. Wagner, R. Srinivasan, J.D. Waller

Associate Professor T.A. Mazzuchi

Associate Professorial Lecturers W.S. Lassiter, D.J. Gantzer, M.A. Ahmed

Assistant Professor T.Z. Irony

Assistant Professorial Lecturer M.A. Youngren

See the School of Engineering and Applied Science for programs leading to the master's, professional, and doctoral degrees.

**201 Survey of Operations Research: Deterministic Models (3)** Falk and Staff

Basic concepts and techniques of deterministic operations research modeling as applied to problems in industrial, governmental, and military decision making. Linear, integer, nonlinear, and dynamic programming; networks; game theory. Prerequisite: Math 33 or permission of instructor. (Fall)

**202 Survey of Operations Research: Stochastic Models (3)** Mazzuchi and Staff

Basic concepts and techniques of stochastic operations research modeling as applied to problems in industrial, governmental, and military decision making. Markov chains, queuing, inventory, regression analysis, forecasting, decision analysis, and simulation. Prerequisite: ApSc 115, Math 33, or permission of instructor. (Spring)



- 209 Mathematics in Operations Research (3)** Marlow, Fiacco, and Staff  
Foundations of optimization theory: linear algebra, advanced calculus, and real analysis. Geometrical interpretations. Numerical methods and use of software. Applications to modeling techniques in operations research. Prerequisite: Math 33. (Fall and spring)
- 211 Numerical Methods in Operations Research (3)** Marlow and Staff  
Solutions of systems of linear and nonlinear algebraic equations. Approximations of functions, numerical integration, solutions of differential and difference equations, computational aspects of modeling techniques, use of software. Prerequisite: OR 209 or permission of instructor. (Spring)
- 216 Stochastic Foundations of Operations Research (3)** Irony and Staff  
Topics in probability theory, stochastic processes, and statistical inference. Foundations of probability, conditional probability, the Poisson process, Markov chains, and Bayesian inference. Introduction to modeling and decision making using influence diagrams. Prerequisite: ApSc 116 or permission of instructor. (Fall and spring)
- 231 Quantitative Methods for Information Systems (3)** Cherian and Staff  
Introductory study of quantitative techniques for problem solving. Statistical concepts, including confidence intervals, hypothesis testing, correlation and regression. Linear programming. Applications and case studies involving management information systems. May not be taken for credit by degree candidates in SEAS. (As arranged)
- 233 Analytic Models for Management and Administration (3)** Clark and Staff  
Application of quantitative methods and concepts and experimental techniques taken from system theory, simulation, decision analysis, discounting, queuing, mathematical programming, and functional analysis. For graduate students outside the School of Engineering and Applied Science. (Fall and spring)
- 235 Systems Thinking and Policy Modeling I (3)** Clark and Staff  
Stock-flow analysis of feedback systems presented for policy analysis and management. System dynamics; principles of systems employed to structure the problem-solving process. Problems and case studies solved using microcomputers. (Fall and summer)
- 236 Systems Thinking and Policy Modeling II (3)** Clark and Staff  
Delays, feedback, prediction, and sampling in dynamic problems. Case studies in dynamic policy analysis. Use of microcomputers, electronic spreadsheets, statistics, and simulation. Includes small-group projects. Prerequisite: OR 235. (Spring)
- 237 Logistics Planning (3)** Marlow and Staff  
Quantitative methods in model building for logistics systems, including organization, procurement, transportation, inventory, maintenance, and their interrelationships. Stresses applications. Prerequisite: ApSc 115, Math 33. (Spring, even years)
- 251 Linear Programming (3)** Falk and Staff  
The simplex method, its variants, and recent interior methods considered from theoretical and computational points of view. Duality, sensitivity, and parametric programming. Large-scale optimization. Prerequisite: OR 209 or permission of instructor. (Fall and spring)
- 252 Nonlinear Programming I (3)** McCormick and Staff  
Basic theoretical and computational topics in optimization theory, including convexity and the optimality conditions. Algorithms for solving unconstrained, linearly constrained, and nonlinearly constrained problems. Applications. Prerequisite: OR 209 or permission of instructor. (Spring)
- 253 Integer and Network Programming (3)** Soland and Staff  
Methods and applications of optimization problems requiring integral solutions. Implicit enumeration, branch-and-bound, and cutting plane methods. Network programming: shortest route, maximum flow, minimum cost flow, and minimum spanning tree problems. Computational complexity. Prerequisite: OR 251 or permission of instructor. (Spring, odd years)
- 254 Applications of Linear and Nonlinear Optimization Theory (3)** McCormick and Staff  
Analysis of optimization models, including areas of nutrition, water pollution, energy, reliability, inventory control, game theory, chemical equilibrium, portfolio selection, and parameter estimation. Solution of nonconvex optimization

problems. Use of sensitivity theory and of the SUMT method for solving constrained problems. Prerequisite: Math 33. (Fall)

- 261 Theory of Games (3)** Falk and Staff  
Mathematical models of conflict and cooperation with applications in economics, business, defense, transportation, and societal issues (voting schemes, fair division, auctions). Concept and computation of equilibrium in n-person games. Prerequisite: Math 33. (Fall)
- 262 Decision Analysis (3)** Soland and Staff  
Decision making under certainty, uncertainty, and one and several criteria. Decision analysis and decision trees, value of information, subjective probability and Bayesian statistics, utility and value theories, multiple-criteria decision making and optimization, goal programming. Prerequisite: ApSc 116 and OR 201 or 251; or permission of instructor. (Fall, even years)
- 271 Forecasting Techniques (3)** Mazzuchi and Staff  
Regression analysis and other heuristic forecasting techniques. Detailed development of the Box-Jenkins technique for time-series analysis, including moving averages and exponential smoothing as special cases. Application to engineering, business, and economics using special computer software packages. Prerequisite: OR 216. (Fall, odd years)
- 273 Discrete Systems Simulation (3)** Staff  
Monte Carlo simulation of discrete stochastic models. Simulation languages. Random-number and random-deviate generation. Statistical design and analysis of simulation experiments. Validation of simulation models. Applications: queuing, inventory, scheduling, and computer models. Prerequisite: ApSc 116, CSci 51, OR 202; or permission of instructor. (Spring)
- 277 Queuing Theory (3)** Staff  
Single-channel exponential queuing systems. Markovian single- and multiple-channel models, including birth-death processes, finite sources, Erlangian models. General arrival and service patterns. Jackson networks. Model building, basic solution techniques, and formal theoretical developments. Prerequisite: ApSc 116, OR 202 or 216; or permission of instructor. (Spring)
- 279 Inventory Control (3)** Staff  
Mathematical techniques applied to decisions about when and how much to produce or purchase. Mathematical models of inventory systems with deterministic and stochastic demands, continuous and periodic review policies, multi-item models with constraints, multi-echelon models. Prerequisite: ApSc 116, OR 202 or 216; or permission of instructor. (Fall, odd years)
- 281 Reliability Theory I (3)** Singpurwalla and Staff  
Mathematical theory: coherent structures, association of random variables, stochastic characterization of wear, preservation theorems, bounds and inequalities. Statistical theory: probabilistic derivation of failure models; Bayesian methods. Life testing, survival analysis, expert opinion. Prerequisite: OR 216. (Fall)
- 282 Quality Control and Acceptance Sampling (3)** Mazzuchi and Staff  
Mathematical and statistical approaches to quality assurance. Control charts, acceptance sampling by attributes and variables, outgoing quality levels, cost of quality, relationship between reliability and quality. Bayesian techniques and time-series methods. Prerequisite: ApSc 115 or permission of instructor. (Spring)
- 284 Computer-Intensive Methods in Industrial and Engineering Statistics (3)** Singpurwalla, Toman, and Staff  
Computer-aided design and analysis of industrial experiments, including factorial, Taguchi, and other designs. Analysis of survival, reliability, and quality control data, including reliability growth and point processes. Simulation techniques in reliability analysis. Corequisites: OR 281; Stat 217. (Fall, odd years)
- 291 Problems in Operations Research (3)** Fiacco and Staff  
Field experience in operations research on a team basis. Each small group locates an actual problem and formulates a solution using operations research models. Prerequisite: Knowledge of FORTRAN or BASIC. (Fall and spring)
- 297 Special Topics (3)** Staff  
Selected topics in operations research, as arranged. May be repeated for credit. Prerequisite: permission of instructor. (As arranged)



- 298 **Research (arr.)** Staff  
Basic or applied research in operations research. May be repeated for credit.
- 299-300 **Thesis Research (3-3)** Staff
- 351 **Advanced Topics in Mathematical Programming (3)** Falk and Staff  
Fractional and geometric programming, branch-and-bound methods, max-min problems, Lagrangian algorithms, nonconvex optimization techniques. Prerequisite: OR 252 or permission of instructor. (Spring, every third year)
- 352 **Nonlinear Programming II (3)** Fiacco and Staff  
Optimality conditions, convex analysis, development of families of unconstrained and constrained algorithms. Discussion of key results in mathematical programming, such as duality, rate of convergence, nonconvex programming, and sensitivity analysis. Prerequisite: OR 252 or permission of instructor. (Fall)
- 353 **Sensitivity and Stability Analysis in Optimization (3)** Fiacco and Staff  
Effects of data perturbations on solutions of a nonlinear programming problem. Theoretical results that characterize and validate calculation of sensitivity of optimal values, solution points, and multipliers with respect to changes in parameters. Sensitivity formulas, bounds for optimal values and solution points. Prerequisite: OR 252. (Spring, every third year)
- 354 **Optimization Using Factorable Functions (3)** McCormick and Staff  
Nonlinear programming when the problem functions are factorable. Polyadic structure of derivatives, high-order unconstrained algorithms, matrix methods for nonlinear programming, global solution to nonconvex programs, Karmarkar's projective method and related interior point methods. Prerequisite: OR 252. (Spring, every third year)
- 371 **Advanced Topics in Forecasting (3)** Singpurwalla and Staff  
Dynamic linear models, Kalman filtering, non-Gaussian filtering, spectral analysis, simulation techniques and optimal control. Prerequisite: OR 271 or permission of instructor. (Spring, even years)
- 373 **Design and Analysis of Simulation Experiments (3)** Staff  
Perturbation and sensitivity analysis. Initial transient problems. Variance reduction techniques. Random number and random variable generation. Response surface methods. Developments in simulation languages. Prerequisite: OR 273 or permission of instructor. (Fall, even years)
- 377 **Advanced Stochastic Models in Operations Research (3)** Staff  
Applied probability models, including the Poisson process, continuous-time, denumerable-state Markov processes, renewal theory, semi-Markov regenerative processes. Applications to queues, inventories, and other operations research systems. Prerequisite: OR 277 or permission of instructor. (Fall, odd years)
- 381 **Reliability Theory II (3)** Singpurwalla and Staff  
Mathematical theory: stochastic characterization of multivariate survival, shock models and wear processes, and reliability theory for multistate components. Statistical theory: recent developments in analysis of failure data. Prerequisite: OR 281. (Spring, odd years)
- 391 **Project for Professional Degree (3)** Fiacco and Staff  
Limited to students in the professional degree program. (Fall and spring)
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Science candidates. May be repeated for credit.

## PHARMACOLOGY

Professors H.G. Mandel (Chair), V.H. Cohn, P. Mazel, J.A. Straw, P. Klubes, F.P. Abramson, S.J. Soldin, T.L. Loo (Research), K.A. Kennedy  
 Professorial Lecturers J. Axelrod, E. Costa  
 Associate Professors D.C. Perry, J. Baumgold (Research), M.R. Pranzatelli  
 Assistant Professors S.R. Patierno, L.L. Werling  
 Assistant Professorial Lecturers B. Huber, L. Totman

Master of Science in the field of pharmacology—Prerequisite: a Bachelor of Arts or Bachelor of Science degree. The undergraduate program must have included the following

courses, or equivalent: BiSc 11–12; Phys 1, 2; Math 31, 32; Chem 11–12, 22, 151–52, 153–54. A course in physical chemistry is also recommended.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Bioc 221–22; Phyl 201, 212; Phar 203, 205, 299–300.

*Doctor of Philosophy in the field of pharmacology*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences.

Research fields: molecular carcinogenesis, genetic toxicology, cancer chemotherapy, AIDS chemotherapy, neuropharmacology, pharmacology of drug abuse, biochemical and molecular pharmacology and toxicology, drug metabolism, pharmacokinetics, micro-analytic pharmacology.

- 203 Fundamental Principles of Pharmacology and Toxicology (3)** Cohn and Staff  
Basic principles of pharmacology, including drug receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms; mechanisms of mutagenesis, carcinogenesis, teratogenesis, and specific organ toxicity; risk assessment and extrapolation. Admission by permission of the instructor. (Fall)
- 205 Pharmacology (8)** Cohn and Staff  
Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis of rational disease therapy. Prerequisite: Phar 203, courses in biochemistry and physiology, or approval of department. (Fall)
- 220 Molecular Events in Toxic Actions (2)** Kennedy  
Metabolism of xenobiotics to cytotoxic products. Environmental and genetic factors influencing toxic actions. Molecular mechanisms of toxicity. Prerequisite: Phar 203. (Spring)
- 222 Genetic Toxicology (2)** Staff  
The action of chemicals and radiation in the induction of DNA damage and repair *in vitro* and *in vivo* and the sequelae of these processes in cells and mammals. DNA repair mechanisms, mammalian cell toxicity, mutagenesis, and carcinogenesis. Prerequisite: Bioc 221–22. (Spring)
- 230 Special Topics in Toxicology (arr.)** Staff  
Selected aspects of toxicology. Content differs each time the course is offered. May be repeated for credit. (Fall and spring)
- 240 Molecular Pharmacology and Toxicology (2)** Patierno  
The impact of molecular biology on pharmacology and toxicology. Molecular mechanisms of drug and chemical action. Gene regulation in metabolism, receptor activity, signal transduction, and cellular stress responses. Gene therapy. Prerequisite: Phar 203, Bioc 221–22, or permission of instructor. (Spring)
- 242 Molecular Carcinogenesis (2)** Patierno  
Molecular biology of cancer initiation and progression. Molecular mechanisms of DNA sequence alteration and repair. Oncogenes, tumor suppressor genes, and metastasis suppressor genes. Prerequisite: Bioc 221–22 or permission of instructor.
- 254 Frontiers in Pharmacology (1)** Klubes  
Recent advances and research in pharmacology. Presentations by laboratory scientists from neighboring institutions. (Spring)
- 258 Cancer Chemotherapy (1)** Mandel and Staff  
Seminars on mechanisms by which drugs inhibit the growth of tumor cells. (Spring, even years)
- 259 Readings: Cancer and Cancer Chemotherapy (2)** Klubes  
Selected readings and discussion of recent advances in cancer and cancer chemotherapy research. Prerequisite: Phar 201 or 205. (Spring, odd years)
- 269 Pharmacology Seminar (1)** Mandel  
Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall)
- 272 Physiological Disposition of Drugs (3)** Cohn  
Mechanisms for the absorption, distribution, metabolism, and excretion of drugs and the physical, chemical, and biological factors affecting these processes are studied through extensive reading of classical and current original literature. Prerequisite: Bioc 221–22, Phar 203, or permission of the instructor. (Spring)



- 273 **Pharmacokinetics: Principles and Applications** (2) Abramson and Staff  
A description of compartmental and physiological models of drug disposition. Problem solving to obtain rate constants, organ clearances, etc., from experimental data. Examples of drug disposition exemplifying various pharmacokinetic approaches. (Spring)
- 275-76 **Advanced Topics in Pharmacology and Toxicology I-II** (1-1) Cohn and Staff  
Lectures and seminars on advances in mechanisms of drug action, pharmacology of new drugs, theoretical aspects of pharmacology, laboratory techniques. (Alternate academic years)
- 277-78 **Advanced Topics in Pharmacology and Toxicology III-IV** (1-1) Cohn and Staff  
Continuation of Phar 275-76. (Alternate academic years)
- 279 **Neuropsychopharmacology** (3) Perry and Staff  
The pharmacology and toxicology of drugs that affect the peripheral autonomic, sensorimotor, and central nervous systems. Prerequisite: Phar 170 or 203 or permission of instructor. (Fall)
- 280 **Neuropharmacology** (2) Perry, Werling  
Fundamental principles. Electrophysiological and biochemical techniques. Neurotransmitters and their pathways in the central nervous system. Drug effects on neurotransmitter pathways. Biochemical basis of mental disease. Prerequisite: Phar 205 or 279 or permission of instructor. (Spring)
- 295 **Reading and Research** (arr.) Staff  
May be repeated for credit.
- 299-300 **Thesis Research** (3-3) Staff
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PHILOSOPHY

University Professors P.J. Caws, K.F. Schaffner

Professors R.H. Schlagel, R.S. French, W.B. Griffith, R.P. Churchill (Chair)

Associate Professor A. Altman

*Master of Arts in the field of public policy with a concentration in philosophy and social policy*—An interdisciplinary program that brings the normative, historical, and analytical skills of philosophical inquiry to bear upon contemporary problems of social policy. Prerequisite: a bachelor's degree from an accredited college or university. Students are expected to have completed the prerequisites to graduate courses.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Two options are available at the discretion of the faculty: (1) a minimum of 24 credit hours of approved graduate course work plus the successful completion of a thesis (Phil 299-300), or (2) a minimum of 36 credit hours of graduate course work that does not include a thesis. All students are required to take four courses selected from Phil 230, 231, 235, 242, 255, 262, and HCS/Phil 775; and, for the public policy core, four courses selected from Stat 111, 183; Econ 217; PSc 203, 209, or 217; Psyc 244; Stat 129 or CSci 100; WStu 240. Phil 205 is open to all students; it is required of those with insufficient background in philosophy, as determined by the department. Each candidate must pass a Master's Comprehensive Examination based on the particular interdisciplinary composition of the student's program of study. Prospective candidates should consult Professor W.B. Griffith, chair of the department.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

### 201-2 Readings and Research (3-3)

Advanced readings and reports. Investigation of special problems. (Academic year)

Staff

- 205 Selected Schools and Problems (3)** Staff  
An advanced review of the rise of modern empiricism, idealism, and pragmatism, with particular attention to controversies regarding problems of method, epistemology, and social and political theory. Recommended for graduate students who have majored in fields other than philosophy. (Offered as the demand warrants)
- 214 Structuralism and Hermeneutics (3)** Caws  
The notion of structure in the human sciences: its antecedents, linguistic expression, and development in philosophy, anthropology, psychoanalysis, historiography, and criticism. Strategies for the decoding of structure in hermeneutics. The apparent metamorphosis of structuralism in postmodern thinkers.
- 230 Ethical Issues in Policy Arguments (3)** Griffith, Churchill  
Critical analysis of ethical foundations of public policy arguments (protection of the environment, health and safety, equality of opportunity). Case studies of appeals to societal values (preference-satisfaction, welfare improvements), to norms of justice or fairness, and to moral rights. Attention to historical contexts and commitments and to racial, gender, and class biases. (Fall)
- 231 Seminar: Economic Justice (3)** Griffith  
Ethical and economic analysis of equity and efficiency of current U.S. income distribution patterns. Theories of justice; economic theories of distribution; assessment of redistribution policies.
- 235 Ethics and Business (3)** Griffith, Lenn  
Concepts and strategies of ethical analysis applied to specific business problems, e.g., risk management, plant relocation, preferential hiring, political advertising; development of theory of corporate social responsibility. Same as SMPP 291. (Spring)
- 242 Philosophy, Law, and Social Policy (3)** Altman  
Examination of basic questions about the role law can and should play in society. Topics include the nature and basis of rights; theories of constitutional interpretation; proposals for legal and political reform of Western liberal democracy. (Spring)
- 251 Seminar: Philosophy of Science (3)** Schlager  
Selected topics.
- 252 Seminar: Epistemology (3)** Schlager  
Critical examination of selected problems or theories of knowledge.
- 255 Philosophy of the Social Sciences (3)** Altman  
Philosophic issues relating to theory, methodology, and application of the social sciences.
- 262 Seminar: Normative Issues in Foreign Policy (3)** Churchill  
Selected issues on the complexities of foreign policy from a normative perspective, including the ethics of military intervention, normative constraints on the pursuit of national interest, the protection of human rights, and international distributive justice.
- 299-300 Thesis Research (3-3)** Staff

## PHYSICS

Professors H.H. Hobbs, O. Bergmann, A.J. Zuchelli, D.R. Lehman (Chair), B.L. Berman, L. Maximon (Research)

Professorial Lecturer A. Ghovanlou

Associate Professors W.C. Parke, N.K. Khatcheressian, M.F. Taragin, E.P. Harper, W.J.

Briscoe, J.R. Peverley, H. Haberzettl

Assistant Professors K.S. Dhuga, C. Bennhold, J.P. Connelly (Research)

**Master of Arts in the field of physics**—Prerequisite: a bachelor's degree with a major in physics at this University, or an equivalent degree.

1. The master's degree program with thesis—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, and 30 credit hours of course work in physics, including Phys 211, 212, 214, 221-22, 299-300; plus two of the following: Phys 224, 225-26, 231, 233, 234, 243, 244.

2. The master's degree program without thesis—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, and 36 credit



hours of course work in physics including Phys 211, 212, 214, 221–22; plus two of the following: Phys 224, 225–26, 231, 233, 234, 243, 244.

The successful completion of a high-level computer language course with a grade of A or B is required for either option.

*Doctor of Philosophy in the field of physics*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including the following required courses: Phys 209–210, 211, 212, 214, 221–22, 224, 231, 232, 233–34 or 243–44; one course chosen from Math 222, 223, 232.

Research fields: nuclear physics—experimental and theoretical studies on the structure, electromagnetic and strong interactions, and scattering of few-body systems at low and intermediate energies; solid-state physics—crystal growth and physical properties of whiskers, and ultrasonic probing of electron scattering in solids.

Consent of a departmental graduate advisor is required for admission to all 200-level courses in physics.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

**209–10 Theoretical Methods in Classical and Quantum Physics (3–3)** Bennhold

Joint offering of the Mathematics and Physics Departments. Topics covered include solutions of partial differential equations encountered in physics; techniques of linear algebra; calculus of variations; complex analysis; applications in physics of the theory of analytic functions; integral equations; and group theory in physics. (Academic year)

**211 Advanced Mechanics (3)**

Haberzettl

Analytic methods of mechanics as a basis for modern theory; variational principles, Lagrange's equations, Hamiltonian formulation, canonical transformations, classical perturbation theory. (Fall)

**212 Special Relativity (3)**

Bergmann

Application of relativistic concepts to the basic fields of physics; space and time, tensors and covariant mechanics of point particles, covariant form of electromagnetism, relativistic variational principles, relativistic quantum equations. (Fall)

**214 Electromagnetic Theory**

Harper

Principles of electrostatics and magnetostatics with applications to the solution of boundary-value problems in electrically and magnetically active media. Maxwell's equations, time-varying fields, and plane-wave propagation. Radiating systems and scattering of radiation, including multipole fields. Dynamics of relativistic particles and radiation from moving charges. (Spring)

**221–22 Quantum Mechanics (3–3)**

Harper, Lehman

General aspects of quantum mechanics with emphasis upon the developmental principles involved. Operators, representations, and transformation theory. Schrodinger and Heisenberg pictures, angular momentum, perturbation theory, scattering theory. (Phys 221: spring; Phys 222: fall)

**224 Statistical Mechanics (3)**

Peverley

Systematic development of classical and quantum statistics. Gibbs paradox, microscopic origins of entropy and other thermodynamic variables, fluctuations, ensemble theory, partition functions, distribution functions, density matrices. Applications include the harmonic oscillator, magnetic systems, ideal gases, degenerate Fermi systems, Bose–Einstein condensation, blackbody radiation, phonons. (Spring)

**225–26 Laboratory (3–3)**

Briscoe, Peverley

Individual work on special topics. Laboratory fee, \$30 per semester. (Academic year)

**231 Quantum Electrodynamics: Theory and Applications (3)**

Lehman

A presentation of the lower-order effects depending upon the quantal nature of the electromagnetic field: Hamiltonian formulation and field quantization, perturbation calculations, Compton effect, photoelectric effect, electron–electron scattering, pair creation and annihilation, indices of refraction, divergence difficulties. (Spring)

- 232 **Quantum Field Theory** (3) Parke, Lehman  
Covariant presentation of general theory of quantized fields, Boson and Fermion fields, theory of S matrix, dispersion relations, and renormalization program.
- 233-34 **Nuclear Theory** (3-3) Staff  
Nuclear interactions, nuclear models, theory of nuclear reactions, pion physics, weak interactions, and electromagnetic interactions. (Academic year)
- 243 **Solid-State Physics: Structure and Binding** (3) Khatcheressian, Peverley  
Crystal structure and binding; the reciprocal lattice, X-ray diffraction. Elastic properties, thermal, electric, optical and magnetic properties of solids, dislocations, and other defects. (Fall)
- 244 **Solid-State Physics: Electronic Properties** (3) Khatcheressian, Peverley  
Electronic properties of solids; band theory, Fermi surfaces. Metals and semiconductors, transport phenomena including thermoelectric and magnetotransport effects, superconductivity. (Spring)
- 250 **Selected Topics** (3) Staff  
Possible topics include nuclear three-body problem; group theory and symmetry principles in physics; differential manifolds applied to physics; electronic states and superconductivity; gauge field theories; dispersion relations and unitarity in scattering theory. May be repeated for credit with permission of graduate advisor. (Fall and spring)
- 291 **Seminar** (1) Maximon  
Lectures on special problems in physics. May be repeated once for credit. (Fall and spring)
- 299-300 **Thesis Research** (3-3) Staff
- 398 **Advanced Reading and Research** (arr.) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated once for credit.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PHYSIOLOGY

**Departmental prerequisite:** Phyl 201 or equivalent is prerequisite to all listed courses except Phyl 205, 212, and 221.

- 201 **Physiology** (8) Staff  
Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 221 or Phyl 205, or consent of chairman of department. Concurrent registration in Phyl 212 is required. Open to Consortium students only with permission of chairman of department. (Spring)
- 205 **Regulatory Cell Biology** (2) Staff  
Lecture (2 hours). An introductory survey of the mechanisms for interconversion and utilization of energy in animal cells. A required course for graduate students intending to take Phyl 201. Prerequisite: BiSc 11-12 or equivalent, and consent of instructor. Open to students in the Columbian College of Arts and Sciences with the approval of the student's major advisor. (Fall)
- 212 **Neurobiology** (3) Staff  
Same as Anat 212. An integrated survey of the structure and function of the human nervous system; lecture, clinical demonstrations, and laboratory. Laboratory fee, \$25. (Spring)
- 221 **Seminar** (1) Cassidy  
Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Content differs each time the course is offered; may be repeated for credit. (Fall and spring)
- 252 **Topics in Cardiovascular Physiology** (2) Staff  
Survey, at an advanced level, of aspects of cardiovascular physiology, especially as interrelated with the respiratory and renal systems. (Fall)
- 259 **Topics in Neurophysiology and Psychophysiology** (2) Lavine  
Selected topics in contemporary neurophysiology, including methods of data collection and analysis, control mechanisms involved in movement and behavior, and sensory processing.



- 295 **Research** (arr.) Staff  
By special arrangement with individual staff members. Approximately four hours per week in the laboratory for each hour of credit. May be repeated for credit.
- 298 **Comprehensive Physiology** (5) Staff  
Guided review of selected areas of physiology appropriate to the student's graduate program. Prerequisite or concurrent registration: Phyl 221. (Fall)
- 299-300 **Thesis Research** (3-3) Staff
- 396 **Advanced Reading and Research** (2) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of physiology and of pertinent areas of the candidate's supporting field. This course satisfies the requirement for Part II of the Cumulative General examination in Physiology.
- 397 **Development of Dissertation Problem** (2) Staff  
Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problems. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology.
- 399 **Dissertation Research** (arr.) Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

### POLITICAL COMMUNICATION

See Communication Studies.

### POLITICAL MANAGEMENT

See Communication Studies.

### POLITICAL PSYCHOLOGY

#### Committee on Political Psychology

J.M. Post (Director), E. Berkowitz, R. Caplan, M. Harmon, J.B. Manheim, P. Poppen, E. Shaw, L. Sigelman, S. Wiley

The Elliott School of International Affairs offers a special field in political psychology. The course sequence is also available to students in Columbian College and Graduate School of Arts and Sciences and the School of Business and Public Management.

- 201 **Fundamentals of Political Psychology** (3) Post  
A review of the interdisciplinary field of political psychology; examination of psychological influences on political behavior at the level of the individual and small group; the psychology of leader-follower relationships; crisis decision making. (Fall)
- 202 **Political Psychology Research Methods** (3) Shaw  
Major research methods of political psychology, using classic articles in the field. Both quantitative methods, such as survey research and content analysis, and qualitative methods, such as personality profiling and comparative case studies, are considered. Prerequisite: PPsy 201. (Fall)
- 203 **Public Opinion and Political Socialization** (3) Wiley  
Same as PSc 220.
- 205 **Political Violence and Terrorism** (3) Post  
The origins and the sociopolitical and behavioral dynamics of political violence and terrorism. Major types of terrorism are differentiated. Implications for anti-terrorist policy. The psychology of hostages. (Spring, alternate years)
- 291 **Applied Political Psychology** (3) Post  
Seminar and practicum in applications of political psychology. Prerequisite: PPsy 201. (As arranged)
- 295 **Independent Study and Research** (1 to 3) Post  
Supervised research in a special topic in political psychology. Preparation of major research paper. Prerequisite: PPsy 201, 202. (As arranged)

Other courses that pertain to political psychology:

- Mgt 210 *Individual and Group Dynamics in Organizations*
- Mgt 212 *Behavioral Factors in the Process of Change*
- Mgt 215 *Conflict Management*
- Mgt 216 *Cross-Cultural Management*
- PSc 228 *Media and Politics*
- Psyc 209 *Psychology of Motivation*
- Psyc 219 *Group Dynamics*
- Psyc 247 *The Psychology of Leadership in Organizations*
- Psyc 253 *Attitudes and Social Cognition*
- Psyc 254 *Social Influence*
- Psyc 291 *Theories of Organizational Behavior*
- PAd 223 *Management Factors in Complex Organizations*
- PAd 224 *Managerial Leadership in Complex Organizations*
- Soc 210 *Theoretical Foundations of Political Sociology*
- Soc 225 *Theories of Social Change*
- Soc 245 *Race Relations*

## POLITICAL SCIENCE

University Professor J.N. Rosenau

Professors B.M. Sapin, J.A. Morgan, Jr., B. Reich, Y.C. Kim, J.M. Logsdon, W.H. Lewis, C.A. Linden, H.R. Nau, M.A. East, J.B. Manheim, C. McClintock, P. Reddaway, J. Post (Research), J.R. Henig, C.C. Joyner, L. Sigelman (Chair), M.J. Sodaro, S.L. Wolchik, J.R. Wright

Associate Professors C.F. Elliott, R.W. Rycroft, C.J. Deering, H.B. Feigenbaum, J.H. Lebovic, R.P. Stoker, N.J. Brown

Assistant Professors S.L. Wiley, J. Mitchell, S.K. Sell, M. Finnemore, F. Maltzman

**Master of Arts in the field of political science**—Prerequisite: a bachelor's degree with a major in political science from an accredited college or university, or an equivalent degree, and high undergraduate scholastic standing.

Required: The general requirements stated under Columbian College and Graduate School of Arts and Sciences and either (1) a reading knowledge of a modern foreign language or a specified level of knowledge in statistics, or (2) two graduate-level courses in a cognate discipline. Students may elect one of the following programs: (1) 30 credit hours of graduate course work, including PSc 299–300, and the satisfactory completion of a Master's Comprehensive Examination in three subfields selected from those listed under the Ph.D. program; or (2) 33 credit hours of graduate course work without a thesis and the satisfactory completion of a Master's Comprehensive Examination in four subfields selected from those listed under the Ph.D. program.

All students must take one course chosen from PSc 201, 230, or 240 during the first semester of graduate study. The course selected must have the approval of the coordinator of graduate studies.

**Doctor of Philosophy in the field of political science**—Students of outstanding ability are admitted to the doctoral program upon recommendation of a departmental graduate committee and the concurrence of the Graduate School.

Required: The general requirements stated under Columbian College and Graduate School of Arts and Sciences. Each student must complete a General Examination, which covers a major and minor field of study.

PSc 201 and 202 are required of all students unless they demonstrate knowledge of the courses' subject matter by passing a waiver examination.

Each student must choose a major and minor field of study from five principal subject-matter divisions. Each subject-matter division has several subfields of study from which the student, in consultation with an advisor, constructs a program. A major field of study consists of three subfields; a minor field of study consists of two subfields.

The subject-matter divisions and their subfields are (1) theory (analysis of Western political thought, analysis of Marxist and Marxist-Leninist thought); (2) comparative and foreign politics (comparative political analysis, comparative communist systems, regional comparative politics, and domestic politics of a specified major political system); (3)



international relations (international politics, international law, international organization, regional international relations, and foreign relations of a specified major political system); (4) American politics (American political process, national policy-making process, American constitutional law and judicial process, and state, local, and urban politics); and (5) public policy (methods of public policy analysis, science policy, domestic policy analysis, and national security policy). Quantitative political analysis may be used as a subfield in any of the subject-matter divisions.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 201 **Introduction to Political Analysis** (3) Wiley, Sigelman  
Alternative approaches to political analysis, construction of research designs, and problems of measurement. Laboratory fee, \$20. (Fall and spring)
- 202 **Empirical Political Analysis** (3) Wiley, Sigelman  
Techniques of social science data analysis, with emphasis on statistics and computer applications. PSc 201 or other previous introductory research training is highly desirable. Laboratory fee, \$20. (Spring)
- 203 **Approaches to Public Policy Analysis** (3) Stoker  
Empirical and normative foundations of systematic policy analysis: concepts, theories, models, issues, strengths, limitations, and uses and misuses in the policy process. (Fall)
- 204 **Methods of Public Policy Analysis** (3) Stoker  
Quantitative and qualitative techniques of systematic policy analysis, such as forecasting, cost-benefit analysis, simulation, operations research, social indicators, and quasi-experimental methods. Prerequisite: PSc 203 or equivalent. (Spring)
- 205 **Readings in Political Theory** (3) Linden, Mitchell  
Selected major works, both ancient and modern, that illuminate basic problems and questions of political theory. (Fall)
- 206 **Topics in Political Theory** (3) Linden, Mitchell  
Advanced readings and group discussions. Analysis and interpretation of selected concepts and schools of thought. (Spring)
- 207 **Modern Political Thought and Ideologies** (3) Linden, Mitchell  
Analysis of some main currents in modern political thought and ideologies. (Fall)
- 208 **Russian Political Thought** (3) Elliott, Linden  
Analysis of contemporary Russian political thought and its antecedents. (Spring)
- 210 **American Political Process** (3) Deering, Sigelman, Maltzman  
A survey of American political institutions, processes, and behavior. (Fall, even years)
- 211 **State and Urban Politics** (3) Henig  
Comparative analysis of the context, institutions, processes, and policies of state and urban political systems. (Fall)
- 212 **State and Urban Policy Problems** (3) Henig  
Analysis of public policy issues confronting state and urban governments; emphasis on the theoretical roots and empirical impact of past and present programs in such areas as housing, education, poverty, and crime. (Spring)
- 213 **Politics and Public Policy** (3) Stoker, Henig  
Examination of political processes that influence policy formulation, policy implementation, and the uses of policy analysis.
- 214 **Topics in Constitutional Law** (3) Morgan  
Lectures and group discussions on constitutional law and politics.
- 215 **Judicial Policy-Making** (3) Morgan  
Role of the judiciary in policy formulation; emphasis on the U.S. Supreme Court and civil liberties issues.
- 216 **American Presidency** (3) Maltzman  
Personalized and institutionalized aspects of the presidency with particular emphasis on the politics of contemporary policy-making. (Spring)
- 217 **Bureaucratic Politics** (3) Rycroft  
Structure and operation of governmental bureaucracy with particular emphasis on the politics of formulating and implementing public policy. (Spring)

- 218 **Legislative Politics** (3) Deering, Wright, Maltzman  
Theory, structure, and process of the U.S. Congress, with emphasis on member-constituency relations, individual and collective decision making, party and committee activities, executive-legislative relations, and interest-group activities. (Fall, odd years)
- 219 **American Political Parties and Elections** (3) Wright  
Nature and functions of American political parties: organizational status, nominating and electoral politics, and role in governing.
- 220 **Public Opinion and Political Socialization** (3) Wiley, Sigelman  
Sources and dynamics of public opinion and political socialization. Same as PPSy 203. (Spring)
- 221 **Interest-Group Politics** (3) Deering, Wright  
Theory, structure, and activities of interest groups in American politics.
- 223 **Science, Technology, and Public Policy** (3) Logsdon, Rycroft, Nau  
Research and intensive analysis of selected policy issues with significant scientific or technological aspects. Prerequisite: IAff 222, 223. (Spring)
- 224 **Domestic Policy Analysis—Selected Topics** (3) Staff  
Analysis of U.S. policy toward selected domestic problems.
- 225 **Budgetary Policy** (3) Staff  
Analysis of selected topics in U.S. monetary and fiscal policy. Offered off campus only.
- 226 **Budgetary Politics** (3) Staff  
Examination of economic policy-making in the United States, with emphasis on major participants and the budget process. Offered off campus only.
- 227 **Electoral Laws and Financial Practices** (3) Staff  
State statutes; registration and filing procedures; federal campaign finance legislation, compliance procedures, and enforcement.
- 228 **Media and Politics** (3) Staff  
Role of the media in American politics, with emphasis on television news coverage, political debates, political advertising, and their impact on the electorate.
- 230 **Comparative Government and Politics I** (3) Kim, McClintock, Feigenbaum  
Examination of basic approaches to comparative politics. (Fall)
- 231 **Comparative Government and Politics II** (3) Kim, McClintock, Feigenbaum  
Comprehensive examination of specific issue areas in comparative political analysis. (Spring)
- 232 **Communism and Democratization** (3) Sodaro  
Comparative analysis of transitions to democracy in communist and post-communist systems, with applications of democratic theory. Same as Hist 232. (Fall)
- 233 **Comparative Communist Systems** (3) Wolchik  
Comparative analysis of the political history and contemporary political processes of communist states, with emphasis on China and Cuba, and non-ruling communist parties. (Spring)
- 234 **Comparative Legislative Systems** (3) Staff  
Selected problems of legislative theory and behavior from a comparative perspective, with particular reference to the parliamentary systems of Germany, France, and Britain. Offered off campus only.
- 238 **U.S. Foreign Economic Policy** (3) Nau  
Exploration of ideas and issues involved in U.S. foreign economic policy, including relationship of economic and security issues, interdependence, protectionism, role of the dollar, industrial policy, and the debt crisis. (Fall)
- 239 **International Political Economy** (3) Nau  
Research seminar exploring alternative theoretical approaches to the study of international political economy and their application to the explanation and interpretation of historical and contemporary events in world political and economic affairs. (Spring)
- 240 **Theories of International Politics I** (3) Lebovic, East, Sell, Finnemore  
Critical examination of contemporary theories, both empirical and normative, with emphasis on actor theory. (Fall)
- 241 **Theories of International Politics II** (3) Lebovic, East, Sell, Finnemore  
Critical examination of contemporary theories, both empirical and normative, with emphasis on interaction theory. (Spring)



- 242 **Problems in International Organizations I** (3) Finnemore  
Collective security, law, and the politics of international organizations. (Fall)
- 243 **Problems in International Organizations II** (3) Finnemore  
Social and economic interdependence and the politics of international organizations. (Spring)
- 244 **International Law I** (3) Joyner  
The sources and development of international law, with special attention given to current trends and future problems. (Fall)
- 245 **International Law II** (3) Joyner  
Critical examination of selected contemporary problems of world order, e.g., legal issues involving global resource regimes, war, economic development, and human rights. (Spring)
- 246 **U.S. Foreign Policy-Making** (3) Sapin  
Patterns and problems in contemporary U.S. foreign policy-making. Attention to domestic political factors as well as relevant institutions and agencies. (Fall)
- 247 **U.S. Foreign Policy** (3) Sapin  
The substance of contemporary U.S. foreign policy; major problems, concepts, and lines of development since World War II. (Spring)
- 248 **U.S. National Security Policy-Making** (3) Sapin, Lewis  
Executive organization and processes for national security policy-making. Attention to relevant theoretical approaches. (Fall)
- 249 **U.S. National Security Policy** (3) Sapin, Lewis  
Fundamental considerations; selected issues, e.g., arms control and disarmament, regional security problems, military assistance. (Spring)
- 250 **Foreign Policy Analysis—Selected Topics** (3) Staff  
Analysis of U.S. foreign policy toward selected world regions.
- 257 **Arms Control and Disarmament** (3) Staff  
Major issues and trends in the postwar development of U.S. arms control and disarmament policy. (Spring)
- 258 **Communist Party of the Soviet Union** (3) Sodaro  
Analysis of the internal evolution of the Communist Party and its role in the Soviet system from its origins to the present day. Same as Hist 258. (Spring)
- 260 **Western European Politics** (3) Feigenbaum  
Examination of the principal characteristics of the British, French, German, and Italian political systems, comparing their institutional and behavioral adaptations to the problems of advanced industrial democracies. (Fall)
- 261 **Politics of the European Community** (3) Staff  
Problems in Western European politics, with emphasis on supranational political processes and selected policy outcomes in the context of the European Common Market. (Spring)
- 262 **The Political Economy of Western Europe** (3) Feigenbaum  
An examination of the relationships between economic interests and politics as they affect the societies of Western Europe. Selected issues of public policy are discussed. (Spring)
- 263 **Russia and Europe** (3) Sodaro  
Russia's role in post-Cold War Europe, focusing on economic and security relations throughout the region and on domestic-foreign policy linkages in the former USSR, Eastern Europe, and Western Europe. (Fall)
- 264 **Governments and Politics of Eastern Europe** (3) Wolchik  
Comparative analysis of domestic political processes and policies in Eastern Europe. (Fall)
- 265 **The International Politics of Eastern Europe** (3) Wolchik  
Major historical, political, social, and regional factors that have shaped the interwar, World War II, and postwar evolution of Eastern Europe; emphasis on foreign relations with outside powers and on regional East-West contacts. (Spring)
- 266 **Readings in Post-Soviet Politics** (3) Elliott, Linden  
Readings in post-Soviet domestic government and politics. Emphasis on Russia; consideration of politics in the Baltics, Ukraine, Trans-Caucasia, and Central Asia. (Fall)

- 267 **Soviet Government and Politics** (3) Elliott, Linden, Reddaway  
Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: PSc 266 or permission of instructor. (Spring)
- 268 **Post-Soviet Foreign Policies** (3) Elliott  
External problems and policies of Russia and the other successor states of the former USSR (especially the Baltics, Ukraine, and southern rim of the former Soviet Union). (Spring)
- 269 **Post-Soviet Military Policies** (3) Elliott  
Contemporary military problems and policies in Russia and the other successor states of the former USSR (especially Ukraine). (Fall and spring)
- 270 **Politics of the People's Republic of China I** (3) Staff  
Introduction to the substance of and literature on contemporary Chinese politics. Discussion and reading. (Fall)
- 271 **Politics of the People's Republic of China II** (3) Staff  
Research seminar. Introduction to the analysis of official Chinese documents and other primary materials. Presentation of student papers. Prerequisite: PSc 270 or equivalent. (Spring, even years)
- 272 **Foreign Policy of the People's Republic of China** (3) Staff  
Objectives: formulation and implementation; the People's Republic of China as Asian state, revolutionary influence, would-be great power. (Spring)
- 274 **Governments and Politics of Japan and Korea** (3) Kim  
Readings and research on the domestic and foreign policies of Japan and North and South Korea. (Fall or spring)
- 275 **International Politics of East Asia** (3) Staff  
Foreign policies and international behavior of the regional states (especially China, Japan, and Vietnam) and the extraregional powers (especially the U.S. and the U.S.S.R.). (Spring, odd years)
- 276 **The Arab-Israeli Conflict** (3) Reich  
Readings and research on the origins, evolution, and issues of the Arab-Israeli conflict. (Spring)
- 277 **Governments and Politics of the Middle East** (3) Reich, Brown  
Readings and research on selected problems of the governments and politics of the Middle East. (Fall)
- 278 **International Relations of the Middle East** (3) Reich, Brown  
Readings and research on the regional and international relations of the Middle East. (Spring)
- 279 **The Powers in the Middle East** (3) Reich  
The role of the powers in the Middle East, with emphasis on the policies of the United States and the Soviet Union. Consideration is given to other major European and Asian powers. (Fall)
- 280 **Governments and Politics of North Africa** (3) Reich, Lewis  
Readings and research on selected problems in the governments, politics, and international relations of North Africa. (Fall)
- 281 **Topics in African Politics** (3) Staff  
Readings, research, and discussion of selected aspects of African domestic and international politics. (Fall)
- 283 **Governments and Politics of Latin America** (3) McClintock  
Readings and discussion on the politics of selected countries in South America, Central America, and the Caribbean. Emphasis on the possibilities for democracy and revolution. (Fall)
- 284 **International Relations of Latin America** (3) McClintock  
Readings and discussion on U.S.-Latin American relations and the foreign policies of selected states. (Spring)
- 285 **Selected Topics in Empirical Analysis** (3) Wiley, Wright  
Advanced techniques of data collection and analysis; varying emphasis on such methods as causal modeling, analysis of variance, regression analysis, and simulation. (Offered as the demand warrants)
- 286 **Selected Topics in American Politics** (3) Staff
- 287 **Selected Topics in Political Theory** (3) Staff
- 288 **Selected Topics in Comparative Politics** (3) Staff



289	<b>Selected Topics in International Politics (3)</b>	Staff
297	<b>Reading (3)</b>	Staff
	Limited to master's degree candidates. Written permission of instructor required.	
298	<b>Research (3)</b>	Staff
	Limited to master's degree candidates. Written permission of instructor required.	
299-300	<b>Thesis Research (3-3)</b>	Staff
397	<b>Advanced Reading (3)</b>	Staff
	Limited to students preparing for the Doctor of Philosophy general examination.	
	May be repeated for credit.	
398	<b>Advanced Research (arr.)</b>	Staff
	Limited to students preparing for the Doctor of Philosophy general examination.	
	May be repeated for credit.	
399	<b>Dissertation Research (arr.)</b>	Staff
	Limited to Doctor of Philosophy candidates. May be repeated for credit.	

## PSYCHOLOGY

Professors J.N. Mosé (Emeritus), R.D. Walk (Emeritus), A.D. Kirsch, V. Kirkbride (Emeritus), D.E. Silber (Chair), C.E. Rice, E. Abravanel, J. Miller, L.A. Rothblat, R.A. Peterson, J. Zeidner (Research), R.D. Caplan, P. Wirtz, J. Post (Research), D. Reiss, S.A. Karp, C.K. Sigelman

Professorial Lecturers R.K. Kahn, M. Sashkin, J.C. Sharf, R.W. Swezey

Associate Professors R.W. Holmstrom, P.J. Poppen, L. Brandt, L.R. Offermann, C.A. Rohrbeck, F.Z. Belgrave

Assistant Professors M.L. Jasnoski, M.C. Zea, C.E. Sager, J.C. Rivero, S. Dopkins, J.M. Ganiban

Assistant Professorial Lecturer C. Reisen

### Clinical Training Staff

Clinical Professors J. Borriello, D.E. Holmes

Associate Clinical Professors D.A. Jensen, M.E. Zedek, E.J. Jordan, D.M. DePalma, R.L. Jenkins

Assistant Clinical Professors M. Harris, P.L. Ellman, M.D. Jasnow, K.R. Miller, L.E. Moldauer, C.E. Parks, W.L. Scarpetti, N.Z. Bien, D.E. Cooper, R.C. Fritsch, R.C. Gresen, Q. Graham, Z. Gyorky, C. Verghese, J. Long, W.D. Tynan, Jr., M.B. Kaiser, P. Gomes

*Master of Arts in the field of psychology*—Prerequisite: the degree of Bachelor of Arts with a major in psychology or an equivalent degree. Admission to the program is limited; preference will be given those who plan to continue toward a Doctor of Philosophy degree.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Of the 24 required credit hours (exclusive of the thesis), a minimum of 18 must be in third-group psychology courses, including Psyc 202 and 203 or 204; 6 credit hours may be in related fields approved by the department. For detailed requirements consult the chair of the doctoral program committee.

*Doctor of Philosophy in the field of psychology*—Prerequisite: the degree of Bachelor of Arts with a major in psychology. Students admitted from other disciplines will be expected to complete prerequisite undergraduate courses to prepare for graduate study in psychology.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including (1) Psyc 202, 203-4, and appropriate statistics courses; and (2) the satisfactory completion of a first-year examination and the General Examination in the major area of study. For detailed requirements, consult the chair of the department or the chair of the doctoral program committee.

Areas of study: clinical, developmental, cognitive neuropsychology, industrial and organizational, and applied social psychology.

Courses at the 200 level are limited to graduate students in psychology, except by permission of instructor.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 201-2 **Psychological Research Methods and Procedures** (3-3) Caplan and Staff  
Required in all graduate psychology programs. Includes philosophy of science, types of research design, and methods of data collection. Prerequisite: graduate standing, a laboratory course in psychology, and an elementary course in statistics. (Academic year)
- 203-4 **Experimental Foundations of Psychology** (3-3) Rothblat and Staff  
Required of doctoral students in psychology during first year of study. Psyc 203: Basic issues in learning and memory. Psyc 204: Physiological processes; sensation and perception. (Academic year)
- 207-8 **Psychological Assessment** (3-3) Holmstrom, Silber  
Open only to clinical graduate students in the Department of Psychology. Theoretical and clinical aspects of assessment; includes interviewing, psychometric tests, and projective techniques. Two-hour laboratory—diagnostic work at clinical facilities. Material fee, \$30 per semester. (Academic year)
- 211 **Assessment of Cognitive Functioning** (3) Staff  
Concepts of intelligence and achievement and their assessment through a variety of individual procedures. Material fee, \$30. Admission by permission of instructor. (Summer)
- 212 **Personality Assessment by Projective Techniques** (3) Staff  
Personality assessment: Rorschach, TAT, and other apperception methods. Material fee, \$25. Admission by permission of instructor. (Summer)
- 213-14 **Seminar: Developmental Psychology** (3-3) Abravanel, Brandt  
Psyc 213: research and theory in developmental psychology, with emphasis on cognitive, perceptual, and language functioning development. Psyc 214: current research and theoretical issues in cognitive and social development in infancy and the social bases of communication and language. (Academic year)
- 215 **Psychodynamic Approaches to Child Assessment and Therapy** (3) Miller  
A broad range of issues in child personality development will be considered, with special focus on drives, interpersonal relations, defenses, intellectual capacities, and moral development. Admission by permission of instructor. Material fee, \$25. (Fall)
- 218 **Seminar: Systems of Psychotherapy** (3) Jasnoski, Silber  
Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego centered, nondirective, transactional, and others. Original sources surveyed. (Spring and summer)
- 219 **Group Dynamics** (3) Miller  
Relationship of the individual to groups, collectivities, and larger social systems. Theory, research, and applications of group and organizational processes, emphasizing contributions of Freud, Bion, Slater, Miller and Rice. Opportunity is provided to attend a group dynamics workshop, which is recommended but not required. Enrollment limited. (Spring)
- 220 **Seminar: Abnormal Psychology** (3) Miller  
Study of selected problems of psychopathology. (Fall)
- 221-22 **Seminar: Group Psychotherapy** (3-3) Borriello  
For graduate students in the clinical psychology program. Open to others if space permits and with permission of instructor. Psyc 221: Survey of group therapy approaches; Psyc 222: Supervised experience with therapeutic groups. Prerequisite to Psyc 221: Psyc 219. (Alternate academic years)
- 223 **Seminar: Human Memory** (3) Staff  
Selected topics of current research interest in the area of human memory. Emphasis on encoding and retrieval processes, amnesia, and disorders of memory. (Spring)
- 225 **Behavioral Approaches to Child Assessment and Therapy** (3) Rohrbek  
Child assessment and treatment from a behavioral viewpoint. The application of conditioning, reinforcement, and shaping principles with reference to specific disorders of childhood.
- 226 **Seminar: Clinical Psychology of Childhood and Adolescence** (3) Brandt  
For graduate students in psychology: open to others with permission of instructor. Exploration of major topics concerning psychopathology in children and adolescents; discussion of nosological issues with emphasis on theoretical and research literature.



- 227-28 Seminar: Principles of Psychotherapy (3-3)** Kahn  
For graduate students in clinical psychology; open to others with permission of instructor, if space permits. Patient's needs and demands on the therapist. Case participation heavily relied upon. Prerequisite: Psyc 218. (Academic year)
- 229 Seminar: Principles of Behavior Change (3)** Peterson  
Behavioral learning methods and theory applied to clinical problems. (Fall)
- 231 Development of Psychometric Instruments (3)** Staff  
Quantitative techniques and principles used in construction, standardization, and evaluation of personality and ability measures for research and practice; quantification of human judgment for measurement purposes. Prerequisite: course in tests and measurements and an elementary course in statistics. (Fall)
- 232 Ego Psychology and Theories of Object Relations (3)** Holmstrom  
Emphasis on theoretical contributions of Freud, Hartmann, Klein, Kernberg, Kohut, and others. Assessment and treatment are addressed, primarily with reference to investigations of borderline and characterological disorders. (Spring)
- 234 Seminar: Theory of Psychological Measurement (3)** Staff  
Examination of classical test theory (which underlies most current test construction and interpretation) and the newly emerging area of item-response theory. Recent developments in validity generalization. (Spring—alternate years)
- 235 Seminar: Community Psychology (3)** Rohrbeck  
For graduate students in the Department of Psychology; open to others, with permission of instructor, only if space permits. Survey of issues and techniques in community psychology; emphasis on educational systems and community psychology issues.
- 236 Seminar: Minorities and Mental Health (3)** Zea  
Factors affecting the mental health of minorities. Treatment considerations and differences in theoretical approaches with respect to minorities. (Spring)
- 237-38 The Practice of General Psychology (3-3)** Staff  
Application of psychological principles and findings to a wide spectrum of human problems. Professional issues facing the psychologist offering services. Participation in the development, implementation, and evaluation of applied psychological services and projects. (Academic year)
- 240 Seminar: Topics in Psychopathology (3)** Silber  
Examination of current research and theory in psychopathology. (Fall)
- 241-42 Family Systems: Theory, Practice, and Research (3-3)** Jasnoski and Staff  
Family dynamics and their implications for assessment and treatment. Special emphasis on the role of research in the process of evaluation of family systems and family therapy. Enrollment limited to advanced doctoral students in clinical psychology. (Academic year)
- 243 Psychoanalytic Theory and Research (3)** Miller  
An introduction to classical and modern psychoanalytic theory and research. A review of Freud's central works, focusing on his case studies and their role in theory development. Emphasis on instinct theory, with comparisons to contemporary studies of dreams, infant observation, male and female personality development, psychopathology, and related topics.
- 244 Theories and Processes of Organizational Management (3)** Staff  
Basic functions and techniques of organizational management—design, control, direction, and decision making—examined from the viewpoint of behavioral science.
- 245 Seminar: Organizational Behavior (3)** Offermann  
Analysis of organizational behavior; emphasis on motivation and productivity. Recent research on employee attitudes, primary group, supervisory leadership, formal and informal organization, job design. (Fall)
- 246 Seminar: Personnel Evaluation Techniques (3)** Sharf  
Techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews, performance ratings, and assessment centers. Consideration of federal guidelines in employee selection. Includes practicum.
- 247 Seminar: Psychology of Leadership in Organizations (3)** Offermann  
Theories and issues related to the emergence and effectiveness of leaders, with focus on leadership behaviors and processes in organizations.

- 248 Organizational Behavior Research Applied to Organizational Intervention and Change (3)** Staff  
Emphasis on development of models of organizational effectiveness; design of valid diagnostic instruments; implementation of research strategies; establishment of program-evaluation criteria. (Fall)
- 249 Organizational Behavior Modification (3)** Staff  
Application of operant reinforcement, behavioral systems analysis, and other experimentally derived procedures, such as goal setting and feedback, to improving individual and group work performance. New approaches to intrinsic job motivation based on covert reinforcement principles. (Spring—alternate years)
- 250 Human Resources Management (3)** Staff  
An examination within a psychological systems perspective of the requirements for integrating employee assessment, placement, training, and motivation modules into a unified human resources development program. Emphasis on models and techniques of organizational development and the utilization of key organizational factors to determine content of the program.
- 251 Behavioral Neuroscience (3)** Rothblat  
The neural basis of behavior, with special focus on the psychobiological determinants of learning, memory, and cognition. Methodologies used for different levels of analysis with normal and brain-impaired subjects.
- 253 Attitudes and Social Cognition (3)** Belgrave  
Social psychology theories, conceptual approaches, and their applications. Attitude formation and change, social cognition, person perception, attribution, information processing, attraction, stereotyping.
- 254 Social Influence (3)** Offermann  
Social psychology theories, conceptual approaches, and their applications. Analysis of intentional and unintentional social influence processes and their effects on behavior. Current research on conformity, social power, social exchange, and impression management.
- 255 Applied Research Methods: Research Design (3)** Poppen  
Analysis of problems in research design in basic and applied social psychological research. Focus on conceptualization, operationalization of variables, and experimental and quasi-experimental design. (Fall)
- 256 Applied Research Methods: Data Collection and Analysis (3)** Poppen, Caplan  
Methods of data collection and analysis, especially in field settings and surveys with nonexperimental designs. Topics include methods of obtaining information (questionnaires, interviews, records); creation of indicators; exploratory analysis of large-scale data bases; analysis and interpretation of data when research units have not been randomly assigned to treatments. (Spring)
- 257 Current Topics in Social Psychology (3)** Poppen, Offermann, Belgrave  
Advanced seminar with focus on major theoretical approaches, research, or problem areas within field of social psychology. Topic changes each semester. (Fall and spring)
- 259 Psychology of Individual and Group Decision Making (3)** Rivero  
Examination of processes in organizational decision making and group behavior for the practical manager. Topics include managerial style and decision making, group and individual decision-making approaches, decision aids and support systems, performance and decision effectiveness, and risk analysis.
- 260 Psychology of Work Group Development (3)** Offermann  
Examination of theory and research on groups as task performance systems. Approaches to team development as a means of improving work group effectiveness, including goal setting, role clarification, increasing interpersonal skills, and conflict resolution. (Spring)
- 263 Evaluation Research (3)** Rice  
Research issues and methods in evaluating the impact of organizational and social intervention and service programs. Specification of program goals and effectiveness criteria; measurement problems; experimental and quasi-experimental designs; political problems surrounding evaluation research. (Spring, even years)



- 268 **Seminar: Neuropsychology (3)** Rothblat  
Selected problems in research relating the brain and behavior. Independent topics each semester, such as sensory processing, brain development and behavior, clinical aspects of nervous system function.
- 277 **Health Psychology (3)** Belgrave, Poppen  
Social and psychological theories and research that relate to health and illness. Application of theories of social learning, attribution, attitude change, and social influence to topics such as health promotion and disease prevention, health compliance, and coping with illness and disability.
- 278 **Behavioral Medicine (3)** Jasnoski, Peterson  
The psychological causes, outcomes, and treatments for a wide variety of medical illnesses. Examination of research on the effectiveness of programs designed to promote health, to encourage compliance, and to foster lifestyle changes.
- 279 **Special Topics in Health Psychology (3)** Staff  
A comprehensive review of a special topic area within health psychology. Topics change each semester. May be repeated for credit. Admission by permission of instructor.
- 281 **Clinical Neuropsychology I (3)** Rothblat  
Analysis of experimental and clinical findings from studies attempting to localize and interpret human brain dysfunction, with emphasis on perceptual and cognitive behavior. Topics include overviews of neuroanatomy and neurological techniques, theoretical consideration of major neuropsychological disorders. Admission by permission of the instructor.
- 282 **Clinical Neuropsychology II (3)** Staff  
Examination of important psychological procedures for the assessment of human brain dysfunction. Instruments and batteries such as the Bender-Gestalt, Wechsler Adult Intelligence Scale, Halstead-Reitan Neuropsychological Battery, and Luria's Neuropsychological Tests. Prerequisite: Psyc 211, 212, 281, and permission of the instructor.
- 287 **Current Topics in Clinical Psychology (3)** Staff  
Advanced seminar with focus on major theoretical approaches, research, or problem areas. Topics vary. May be repeated for credit.
- 288 **Current Topics in Industrial/Organizational Psychology (3)** Staff  
Advanced seminar with focus on major theoretical approaches, research, or problem areas. Topics vary. May be repeated for credit.
- 289 **Seminar: Current Topics in Experimental Psychology (3)** Staff  
Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each semester; may be repeated for credit. (Fall and spring)
- 290 **Seminar: Macro-organizational Behavior (3)** Rice  
Examination of variables characterizing the total organization as the unit of analysis; the relationship of such variables to the behavior of the individual. Complexity, power, and conflict will be considered, along with contextual dimensions such as organizational environment. (Fall, odd years)
- 291 **Theories of Organizational Behavior (3)** Caplan  
Examination of current theoretical models and research. (Spring)
- 292 **Seminar: Perception (3)** Staff  
Study of current research and theory in the experimental psychology of perception and perceptual development. (Spring)
- 295 **Independent Research (3)** Staff  
Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated for credit.
- 299-300 **Thesis Research (3-3)** Staff
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy major field examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## PUBLIC ADMINISTRATION

Professors S.R. Chitwood, M.M. Harmon, S.J. Tolchin, W.C. Adams, B.L. Catron, S.J. Trachtenberg, K.E. Newcomer, W.A. Davis, B.T. Pitsvada  
Associate Professors J.F. Kasle, J.E. Kee (Chair), C.J. McSwain, H.L. Ernstthal

See the School of Business and Public Management for programs of study leading to the degrees of Master of Public Administration and Doctor of Philosophy.

- 205 Introduction to Public Administration and Management (3)** Chitwood, McSwain  
Provides frame of reference for study of public administration. Historical development, contemporary approaches, roles of the public manager. Ethics and norms, administrative responsibility and public interest. Management in the public sector. (Fall and spring)
- 208 Ethics and Public Values (3)** Catron  
Ethical dimensions of personal and professional judgments of public officials. Cases are used to consider the ethos of public organizations and the moral foundations of public policy. (Fall)
- 212 Legislative Management and Congress (3)** Tolchin, Kasle  
Analysis of Congress as a management system; examination of its internal administration and its role in formulating policy through legislation. Executive-legislative relationships, staffing practices, budget processes, leadership, rules and procedures, oversight functions, and the management of foreign policy are examined. (Fall)
- 213 Administration in the Federal Government (3)** Tolchin  
Critical analysis of the structure and administration of the federal government from both a managerial and political perspective. Emphasis on executive branch organization, integration, and coordination, as well as current trends in government regulation, accountability, and effectiveness. (Fall)
- 215 Law and the Public Administrator (3)** Chitwood, Kasle  
Exploration and analysis of the functions of law in a democratic society. Emphasis is placed upon the procedural, historical, and jurisprudential dimensions of American law. This broad perspective seeks to convey understanding of the law as a legal and moral force guiding and constraining public decision making. (Spring)
- 216 Federal Government Regulation of Society (3)** Tolchin  
Analysis of the federal regulatory process as it affects the public and private sectors. Specific problems involving presidential management, policy conflicts, reform efforts, legislative oversight, and economic deregulation are emphasized. Same as SMPP 203. (Spring)
- 217 Seminar: Development Administration I (3)** Staff  
The nature of program development and implementation. Specific organization and management problems of less developed countries. National, cultural, and political context. The giving of assistance: types of technical aid; problems of working with aid givers; analytical methods. (Fall)
- 218 Seminar: Development Administration II (3)** Staff  
The transfer of administrative capability from one country to another. Political and administrative development theories. The role of innovation. Strategies of institutional development. Organization of natural resource management. (Spring)
- 221 Organization Theory and the Public Sector (3)** Harmon  
Analysis of organization theory with special focus on public organizations; current issues in organization theory; decision making; the organizational environment and the changing nature of organizations in a postindustrial society. (Fall and spring)
- 223 Management Factors in Complex Organizations (3)** McSwain  
Analysis of the nature and characteristics of management and behavior in public organizations. Approaches to management and leadership in public organizations; influence and control systems; future trends. (Fall and spring)
- 224 Managerial Leadership in Complex Organizations (3)** Chitwood, Kee  
What the manager must know and do to provide leadership and guidance in large, complex organizations. An exploration of factors and processes that condition effective executive and managerial leadership. (Spring)



- 231 **Human Resources Management (3)** Staff  
Same as Mgt 204.
- 232 **Global Human Resources Management (3)** Staff  
Same as Mgt 206.
- 233 **Seminar: Manpower Planning, Development, and Utilization (3)** West  
Examination of public and private manpower trends, problems, policies, and programs. Exploration of approaches to the analysis and administration of manpower programs. Analysis of impact of economic, political, and social factors on manpower. (Fall)
- 235 **Seminar: Technology Change and Professional Human Resource Planning (3)** Frame  
Addresses human resource problems arising from automation and other technological changes. Evaluation of these developments in government, business, and educational organizations, and their implications for productivity, employment, training, and education. Analysis of economic, political, and social factors influencing public and private human resource policies. (Spring)
- 236 **Unionism and Collective Bargaining (3)** Burdetsky  
Same as Mgt 208. (Fall)
- 242 **Administration of State and Local Governments (3)** Staff  
Examination of state and local governmental structures and functions, their place within the federal system, their revenue sources, their limitations, and the alternatives available to encourage more effective administration to meet public and private demands. (Fall)
- 245 **Intergovernmental Relations (3)** Kee  
Assessment of the impacts and consequences of changes in the administration of intergovernmental policies and programs in the federal system. Legislation, roles, and responsibilities of federal, state, regional, and local systems are examined from both theoretical and practical vantage points.
- 246 **Dynamics of Citizen Participation in Administration (3)** McSwain  
Review of the basic theory and principles of democracy in the American system of governance. Analysis of the nature of participation in a pluralistic society, including the characteristics and dynamics of citizen-based organizations. Exploration of effective methods or models by which citizens may contribute to administration. (Fall)
- 248 **Financing State and Local Government (3)** Kee  
Analysis of the theory and practice of public finance in state and local governments. Includes the financing of services through municipal taxation, intergovernmental funds, debt instruments, and other revenue sources. Review of expenditures as well as financial management practices. (Fall)
- 249 **Urban Public Policy (3)** Staff  
Examination of selected national policies and their effects on urban areas and governments. Emphasis on policy dimensions of urban systems and their relationship to the social, political, and economic context. Against the background of urban politics and administration, areas of health, education, welfare, manpower, transportation, and housing will be addressed. (Spring)
- 251 **Governmental Budgeting (3)** Staff  
Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting; their role in the management process. (Fall)
- 252 **Public Expenditure Analysis and Planning (3)** Kee  
Intensive analysis of the concepts and principles of economics as applied to the public sector and the analytic techniques used by government agencies for planning, allocating, and managing scarce resources in the implementation of public programs. Topics include benefit-cost analysis and tax and expenditure analysis. (Fall and spring)
- 253 **Financial Management in the Public Sector (3)** Staff  
Intensive analysis of the concepts, principles, and general practices of financial management within federal departments and agencies, focusing on the interrelationships of financial and program functions and drawing on the several financial disciplines of budgeting, accounting, and auditing. (Spring)
- 260 **Policy Formulation and Administration (3)** Staff  
Impact of economic and political factors on public policy formulation and implementation; intensive analysis of the analytical, normative, and decision-making

models of the policy process with special emphasis on their relationship to current policy problems. (Fall and spring)

- 261 **Policy Analysis in Public Administration** (3) Catron, Newcomer  
Current issues in public policy analysis. Conceptual problems encountered in policy analysis. The role and limits of analytic techniques in the development, implementation, and evaluation of public policy. (Fall and spring)
- 264 **Public Program Evaluation** (3) Newcomer  
Theory and practice of program evaluation and evaluative research. Exploration of scope and limitations of current practice in evaluation, considering economic, political, social, and administrative factors. Examination of methodological considerations for design, data collection, analysis, and dissemination. (Spring)
- 267 **Cases in Public Policy** (3) Catron  
Critical analysis of topical issues in public policy, using a case-study approach. Specific issues covered will vary. Designed principally for M.P.A. students in the last half of their program. (Summer)
- 270 **Telecommunication Administration** (3) Kasle  
Human factors in telecommunication innovations within a public organization. Federal role in research, development, and regulation of telecommunications. Acquisitions process for major systems in federal agencies. International telecommunication policies and controversies. (Fall and spring)
- 271 **Telecommunications Management** (3) Kasle  
Emphasis on planning in regulated industries, managing in a technology-based industry, and personnel development. Varieties of management styles and their strengths and weaknesses; legal constraints; responsibilities and ethics. (Fall and spring)
- 272 **Telecommunications Finance** (3) Staff  
Theories and approaches to telecommunications economics and finance. Examination of cost and price setting, cost allocation, price de-averaging in response to competition, tariffs, accounting and jurisdictional separations, predatory pricing, and aggregate valuation and operating measures. (Spring)
- 274 **Regulation of Communications Common Carriers** (3) Kasle  
The history, development, law, and public policy issues of communications common carriers; emphasis on telephone and satellite industries; the impact of antitrust law; the effects of divestiture; the reconfiguration of the telephone industry; future trends. (Fall and spring)
- 275 **Telecommunications Choices for Public Managers** (3) Kasle  
Critical management and policy issues facing the public manager in telecommunications. Location of managerial responsibility, planning methods and needs surveys, centralized vs. decentralized management and control, in-house facilities vs. cost/time sharing, controlling costs, productivity implications, and networking. (Spring)
- 280 **Purchasing and Materials Management** (3) Sherman  
Same as MLOM 280.
- 281 **Procurement and Contracting** (3) Sherman  
Same as MLOM 281.
- 282 **Government Contract Administration** (3) Sherman  
Same as MLOM 282.
- 283 **Pricing and Negotiation** (3) Sherman  
Same as MLOM 283.
- 285 **Systems Procurement and Project Management** (3) Sherman  
Same as MLOM 285.
- 288 **Field Problem Studies** (3) Staff  
Field research and approved internships on selected issues and aspects of public administration, including specific policy and management problems arising in governmental agencies and related public institutions. Open to master's students upon completion of 9 hours toward the degree program and with the consent of the intern coordinator. (Fall and spring)
- 289 **Public Program Management and Policy Implementation** (3) McSwain  
Review of the diverse concepts and issues in public administration; analysis and integration of political, economic, managerial, and leadership values and issues that are likely to be raised in implementing public policies in the future. Open only to M.P.A. degree candidates in their final semester of study; serves as a capstone seminar to the M.P.A. program. (Fall and spring)



- 290 Special Topics (3)** Staff  
Experimental course; new course topics and teaching methods. May be repeated once for credit.
- 295 Research Methods (3)** Adams, Newcomer  
Theory and practice in research methodology. Data sources and gathering, research models and designs. Critical evaluation of research studies. Emphasis on application of research methods to policy questions. (Fall and spring)
- 296 Statistical Applications in Public Administration (3)** Adams, Newcomer  
Use of statistics, computers, and SPSS in research and program evaluations. Emphasis on interpretation and use of statistics. Development of basic statistical competency; frequency distribution, sampling, central tendency, variability, correlation, probability, regression. (Fall and spring)
- 298 Directed Readings and Research (3)** Staff  
Supervised reading in selected fields within public administration. Admission by permission of instructor. May be repeated once for credit.
- 299 Thesis Seminar (3)** Staff
- 300 Thesis Research (3)** Staff
- 311 Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
Same as SMPP 311.
- 323 Seminar: The Complex Organization (3)** McSwain  
Unique problems of complex organizations: public, private, and mixed. Emerging concepts and theories. Selected issues.
- 373 Seminar: Public Administration and American Political and Social Institutions (3)** McSwain  
Supervised in-depth study of contemporary and historical literature in selected fields in public administration. (Spring)
- 374 Seminar: Trends in Public Administration Theory (3)** Harmon  
Survey of contemporary normative and epistemological issues in public administration theory and practice. Analysis of the past and present influence of logical positivism, behaviorism, humanism, existentialism, and phenomenology. (Fall)
- 377 Seminar: Social Action and Public Policy (3)** Catron  
Interdisciplinary approach to the normative foundations of public policy. Focus on theoretical problems of social action; interrelation of theory and practice. (Spring)
- 393 Substance and Method: Current Topics and Research (1)** Staff  
Current research discussed in a colloquium setting. The conduct of research and presentation of research findings. May be repeated for credit.
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to doctoral candidates. May be repeated for credit.

## PUBLIC POLICY

### Doctoral Committee on Public Policy

C.E. Rice (Acting Chair), M.D. Bradley, J.J. Cordes, W.B. Griffith, J.R. Henig, R.K. Reigelman, L. Sigelman, N. Singpurwalla, H. Solomon, R. Stoker, P. Wirtz

Columbian College and Graduate School of Arts and Sciences offers interdisciplinary programs leading to the degrees of Master of Arts and Doctor of Philosophy in the field of public policy. The master's program allows students to concentrate in one of three policy areas: environmental and resource policy, philosophy and social policy, or women's studies. Students not desiring such a specialization or wishing to prepare for doctoral work in public policy may undertake a more general program. The doctoral program, intended for those wishing to pursue academic or policy-making careers, is concerned with policy research and analysis; students may select an applied field of study in education policy, employment policy, health policy, natural resources and environmental policy, national security policy, and science and technology policy.

*Master of Arts in the field of public policy*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. For the general program, the requirements include a core curriculum consisting of PPol 211, 290; Econ 221;

Mgt 225; PSc 203, 209; Phil 230; plus five elective courses chosen with the approval of the advisor. For specific concentration requirements, see Environmental and Resource Policy, Philosophy, or Women's Studies.

*Doctor of Philosophy in the field of public policy*—Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including (1) a prequalifying core curriculum consisting of PPol 211; Econ 221–22; Mgt 225; Phil 230; PAd 221; PSc 203, 209; (2) a written qualifying examination; (3) a post-qualifying core consisting of Soc 776 and Mgt 391; (4) a minimum of 18 hours related to one of the six policy fields; (5) completion of the general examination in the form of an approved dissertation proposal.

- 211 Research Methods in Policy Analysis (3)** Staff  
Survey of methods used in public policy analysis and research, including causal modeling, experimental and quasi-experimental designs, measurement issues, analysis of secondary data, and qualitative research methods. (Fall)
- 290 Advanced Seminar in Public Policy (3)** Staff  
A capstone seminar limited to master's students in the general program in public policy. Integration of course work through discussion of selected policy issues. (Spring)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## RADIOLOGICAL SCIENCES

Professors D.J. Goodenough, C.C. Rogers, D.O. Davis (Chair), B.W. Wessels  
Associate Professors E.D. Yorke, T.C. Fearon, F. Atkins  
Assistant Professors P.F. Butler, L.K. Hedges (Research)

*Doctor of Philosophy in the field of radiological sciences with a concentration in medical physics*—Prerequisite: A bachelor's degree in physics or the equivalent.

Required: The general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Rad 203, 204, 205, 206, 207, 208, 209, 210, and the General Examination.

Research fields: radiation therapy physics, radiobiology, diagnostic radiology physics, physics of nuclear medicine, health physics, information systems, and biophysics.

- 201 Advanced Topics in Nuclear Magnetic Resonance I (3)** Hedges  
Topics include generation of nuclear magnetic resonance signals, Bloch equations, rotating frame analysis, relaxation mechanisms, quadrature phase detection, chemical shift, receiver coil design, image encoding, slice selection shim coils, magnet design, data processing, quality assurance, and zonal and tesseral harmonics mapping. Prerequisite: permission of instructor.
- 202 Advanced Topics in Nuclear Magnetic Resonance II (3)** Hedges  
Recent developments in nuclear magnetic resonance imaging, magnet design, surface coil design, and image quality analysis; related research developments. Prerequisite: Rad 201 or permission of instructor.
- 203 Physics in Medicine I (3)** Fearon  
Atomic and nuclear physics, interactions of charged particles with matter, interactions of electromagnetic radiation with matter, neutron physics, radiation detection and measurement.
- 204 Physics in Medicine II (3)** Hedges  
Principles of electricity and magnetism, electronics with applications to x-ray generators, clinical linear accelerators, patient monitoring equipment. Physics of magnetic resonance imaging and ultrasound. Applications of computers and computer science in medicine. Prerequisite: Rad 203 or permission of instructor.
- 205 Physics of Diagnostic Radiology, Therapeutic Radiology, and Nuclear Medicine I (3)** Fearon  
Design of x-ray units; image formation, digital imaging, computed tomography, nuclear magnetic resonance imaging, ultrasound imaging. Nuclear structure, radioactive decay, nuclear medicine detectors and imaging techniques, counting statistics, internal emitter dosimetry. Prerequisite: Rad 203 or permission of instructor.



- 206 Physics of Diagnostic Radiology, Therapeutic Radiology, and Nuclear Medicine II (3)** Yorke  
High-energy therapy machines, dosimetry theory and applications, concepts of patient treatment planning, Brachytherapy, display and evaluation of dose distributions, electron-beam therapy. Principles and concepts of radiation safety. Prerequisite: Rad 203 or permission of instructor.
- 207 Medical Physics Radiation Laboratory I (3)** Butler, Fearon  
Practicum based on the calibration and quality assurance programs for x-ray equipment used in diagnostic radiology. Prerequisite: Rad 203 or permission of instructor.
- 208 Medical Physics Radiation Laboratory II (3)** Wessels  
Practicum based on the calibration and quality assurance programs for therapeutic radiology. Prerequisite: Rad 203 or permission of instructor.
- 209 Medical Physics Radiation Laboratory III (3)** Atkins  
Practicum based on the calibration and quality assurance programs for nuclear medicine. Prerequisite: Rad 203 or permission of instructor.
- 210 Special Topics in Medical Physics (3)** Wessels  
Experimental and clinical training in diagnostic radiology, nuclear medicine, and therapeutic radiology. Prerequisite: Rad 203 or permission of instructor.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## RELIGION

University Professor S.H. Nasr

Professors H.E. Yeide, Jr. (Chair), D.D. Wallace, Jr., A.J. Hildebeitel

Associate Professor S.A. Quitslund

Assistant Professors R.J. Eisen, P.B. Duff

*Master of Arts in the field of religion*—Prerequisite: the degree of Bachelor of Arts with a major in religion from this University, or an equivalent degree, and reading knowledge in a foreign language related to the program of study (which may be demonstrated after enrollment in the program).

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. Of the 24 credit hours of required courses (exclusive of the thesis), at least 12 must be in third-group religion courses; a maximum of 9 may be in a closely related field outside the Department of Religion as approved by the department. The Master's Comprehensive Examination must cover three fields (the thesis research must be on one of these three fields) selected from the following: the Hebrew Scriptures, the New Testament, Christianity, Hinduism, Islam, Judaism, history of religion in America, modern religious thought, ethics, sociology of religion, and history of religions. A reading knowledge examination, usually in French or German, is required; however, Hebrew or Greek is acceptable for those students whose thesis area is in the Biblical field and Arabic, Sanskrit, or an Eastern language for those whose thesis area is in the history of religions.

*Master of Arts in the field of history of religions—Hinduism* (Consortium of Universities program)—Prerequisite: A Bachelor of Arts degree with a suitable background in the study of religions of South Asia and reading knowledge in a foreign language, usually French or German (which may be demonstrated after enrollment in the program).

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study consists of 24 hours of course work (exclusive of thesis) selected from upper-division and graduate courses of member universities of the Consortium, as determined by the Department of Religion, including a sequence of four courses in the literature of the Hindu tradition and one course on method in history of religions. A degree candidate at George Washington University must take a majority of the credit hours toward the degree from this university. The Master's Comprehensive Examination must cover the following: methods in the study of religions, thematic comparisons between the Hindu tradition and at least two other religious traditions, including at least one Western tradition, and a special field in Hindu tradition. At least two semesters of either Sanskrit or Hindi must be taken in addition to the required courses for graduate credit. More complete information regarding program requirements is available from the program advisor, Professor A.J. Hildebeitel.

Doctor of Philosophy in the field of American religious history—See History.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 209–10 **Biblical Studies** (3–3) Duff  
Main problems of Biblical literary, historical, and theological criticism.
- 213 **Judaism in Late Antiquity** (3) Eisen  
Selected topics.
- 222 **Ethics** (3) Yeide  
Selected topics.
- 235 **Modern Roman Catholicism** (3) Quitslund  
Important leaders and their ideas in selected developments since 1800—doctrinal, spiritual, biblical, liturgical, and ecumenical. Emphasis on the 20th century.
- 237 **Theological Analysis** (3) Quitslund  
Historical and topical study of the development of important ideas in such areas as Christology, ecclesiology, and death.
- 238 **Topics in Jewish Thought** (3) Eisen
- 249 **Myth, Ritual and Symbolism** (3) Hiltebeitel  
Method and theory in the interpretation of myth and narrative, ritual and sacrifice, and symbolism, with primary reference to the history of religions.
- 255 **The Goddess in India and Beyond** (3) Hiltebeitel  
The goddess traditions of Hinduism, with some attention to goddess traditions in the ancient Near East and the Mediterranean. Classical Sanskrit, Tantric, and popular expressions of Hindu goddess worship. Comparative studies and the issues of diffusion and archetypes.
- 256 **Vedic Religion** (3) Hiltebeitel  
Study of the Vedic literatures that classical Hinduism regards as its founding revelation: the Vedas, Brahmanas, Aranyakas, and Upanishads. Rig Vedic poetry and mythology, the development of sacrificial ritual, and Upanishadic wisdom teachings.
- 257 **India's Great Epics** (3) Hiltebeitel  
The Mahabharata and the Ramayana are treated in alternate offerings of the course. These founding epic texts of devotional (bhakti) Hinduism are taught in English translation. Vernacular and performative versions of the epics and Western adaptations.
- 258 **Currents of Modern Hinduism** (3) Hiltebeitel  
Hinduism since the early seventeenth century. Colonialism, the impact of missionaries, orientalism, reform, relations between Brahmanical and popular Hinduism, Sanskrit and vernacular traditions, regionalism, communalism, nationalism, fundamentalism, politicized "syndicated" Hinduism, and secularism.
- 260 **Topics in the Study of Islam** (3) Nasr  
Study of sources and approaches to the investigation of Islam by both Western Islamicists and Muslim scholars, with discussion of the main controversial issues and differences in methods used by various schools of scholarship. Prerequisite: A course on Islam or permission of instructor.
- 261 **Topics in Islamic Thought** (3) Nasr  
Perennial major issues in Islamic theology, philosophy, and Sufism such as Divine Unity, prophetology, eschatology, religious knowledge, sacred law, and ethics. Prerequisite: A course on Islam or permission of instructor.
- 271 **American Religion to 1830** (3) Wallace  
Religious thought and life during the Colonial and early National period.
- 273 **American Religion Since 1830** (3) Wallace  
Religious thought and life from the Civil War to the present.
- 291–92 **Readings and Research** (3–3) Staff  
Investigation of special problems.
- 299–300 **Thesis Research** (3–3)

#### ROMANCE LANGUAGES AND LITERATURES

- 270 **Seminar: Literary History** (3) Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.



- 271 **Seminar: Literary Criticism (3)** Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 272 **Seminar: Literary Theory (3)** Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 273 **Seminar: History of the Language/Linguistics (3)** Staff  
Topic to be announced in the *Schedule of Classes*. May be repeated for credit provided the topic differs.
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

### RUSSIAN AND EAST EUROPEAN STUDIES

**Program Committee:** S.L. Wolchik (Director), H. Agnew, M.A. Atkin, C.F. Elliott, C.A. Linden, J.R. Millar, C.A. Moser, Y. Olkhovsky, J. Pelzman, P. Reddaway, M.J. Sodaro, R. Thornton

*Master of Arts in the field of Russian and East European studies*—Offered by the Elliott School of International Affairs, this multidisciplinary program gives students a broad grasp of the history, politics, economics, cultures, and languages of Russia and Eastern Europe.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Before acceptance into the program, all students must show evidence of satisfactory completion of two years of study of Russian or an appropriate East European language. Degree candidates must demonstrate professional proficiency (1LR R3) in Russian or an appropriate East European language. Students are required to take the ETS examination to demonstrate this proficiency. The language examination is normally taken before the student has completed the first 15 hours of work; it must be taken before the comprehensive examination. Credit for language study is not counted toward degree requirements.

Required: the general requirements stated under the Elliott School of International Affairs. The program consists of either a 30-credit-hour option with a thesis or a 36-credit-hour option without a thesis. All students must take three courses in the required core field of Russian/Soviet internal and external affairs. Those in the 30-hour program prepare for two additional fields, while those in the 36-hour program prepare for three additional fields. Master's Comprehensive Examinations must be passed in each of the fields for which the student has prepared.

All students are expected to have background preparation of at least two courses in Russian history and one course in either Russian/Soviet government and politics or Russian/Soviet foreign policy. If any of the background courses are lacking, equivalent courses must be taken for graduate credit and can be counted toward degree requirements.

Of the three courses taken in the required core field, one must be in Russian/Soviet internal affairs and one in Russian/Soviet external affairs. Courses that satisfy the internal affairs requirement are Hist 246, PSc/Hist 258, PSc/Hist 232, and PSc 266 and 267. Courses that satisfy the external affairs requirement are Hist 255 and PSc 263 and 268. Students in the nonthesis program must prepare for a field in East European history or politics; those in the thesis program must take at least one course in East European history or politics.

Other fields in Russian and East European affairs are as follows. (1) Former Soviet and East European economics (Econ 267, 268, 367). (2) Ideology and political thought (PSc 207, 208). (3) Russian literature and culture (Slav 161–62, 165, 166). (4) Post-Soviet military policy and strategy (Hist 255–56; PSc 269). (5) Modern Russian history (Hist 217, 218, 246). (6) Comparative and international aspects of communism (PSc/Hist 232; PSc 270). (7) East European history (Hist 205, 206). (8) East European government and politics (PSc 264, 265). (9) Advanced Russian/Soviet government, politics, and policy (PSc 267 is required; other courses are IAff 292; PSc 263, 266, 268; Hist 253–54, 259–60; Hist/PSc 232, 258; Geog 265).

*Concentration in Russian literature and culture*—Students may choose either the thesis or nonthesis option. They must take the required core field in Russian/Soviet internal and external affairs in addition to fields selected from (1) 19th-century Russian literature (Slav

171, 172; (2) Russian/Soviet literature (Slav 165, 166, 173, 174); (3) Russian culture (Slav 161-62).

For listings of 100-level courses, see the Undergraduate Programs Bulletin.

The following courses are applicable to Russian and East European studies.

- Econ 267 *Economies of the Former Soviet Union and Eastern Europe*
- Econ 268 *Economies of the Former Soviet Union and Eastern Europe in Transition*
- Econ 367 *Seminar: Topics in the Study of Formerly Centrally Planned Economies*
- Geog 265 *Seminar: Geography of the Former Soviet Union*
- Hist 188 *History of Chinese Communism*
- Hist 205 *Readings Seminar: Eastern European History, 1772-1918*
- Hist 206 *Readings Seminar: Eastern European History, 1919-1945*
- Hist 217 *Readings/Research Seminar: Russian and Soviet Thought*
- Hist 218 *Readings/Research Seminar: Soviet Nationalities*
- Hist/PSc 232 *Communism and Democratization*
- Hist 237 *Readings Seminar: Soviet Foreign Policy, 1917-1964*
- Hist 246 *Readings/Research Seminar: Modern Russia and Soviet Union*
- Hist 253-54 *Readings Seminar: History of Sino-Soviet Relations*
- Hist 255-56 *Readings Seminar: U.S.-Soviet Strategic Relations Since World War II*
- Hist/PSc 258 *Communist Party of the Soviet Union*
- Hist 259-60 *Research Seminar: Problems in U.S.-Soviet-Chinese Relations*
- IAff 292 *Colloquium: Russia and Eastern Europe*
- PSc 207 *Modern Political Thought and Ideologies*
- PSc 208 *Russian Political Thought*
- PSc 263 *Russia and Europe*
- PSc 264 *Governments and Politics of Eastern Europe*
- PSc 265 *The International Politics of Eastern Europe*
- PSc 266 *Readings in Post-Soviet Government and Politics*
- PSc 267 *Soviet Government and Politics*
- PSc 268 *Post-Soviet Foreign Policies*
- PSc 269 *Post-Soviet Military Policies*
- PSc 270 *Politics of the People's Republic of China I*
- Slav 161-62 *Russian Culture*
- Slav 165 *Russian Literature from the Revolution to World War II*
- Slav 166 *Russian Literature from World War II to the Present*
- Slav 171 *19th-Century Russian Prose*
- Slav 172 *19th-Century Russian Poetry*
- Slav 173 *20th-Century Russian Prose*
- Slav 174 *20th-Century Russian Poetry*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

## SCIENCE, TECHNOLOGY, AND PUBLIC POLICY

**Program Committee:** R.W. Rycroft (Director), M.C. LaFollette, J.M. Logsdon, N.S. Vonortas, M.B. Wallerstein, R.A. Williamson

**Master of Arts in the field of science, technology, and public policy**—The Elliott School of International Affairs offers an interdisciplinary program that focuses on interactions among scientific development, technological change, and governmental activities, both domestically and internationally. The program is designed to train individuals to understand and manage issues of science and technology policy.

**Prerequisite:** the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School. The program consists of 36 credit hours, which may include 6 hours of thesis research. Students must pass Master's Comprehensive Examinations in three fields, including science, technology, and public policy (IAff 222, 223; PSc 223, and an elective approved by the advisor), policy analysis (a minimum of two courses, usually drawn from Econ 211, 212, 283, 284; IAff 253, 254; PSc 203, 204; PAD 260, 261, 295, 296), and an elective field (a minimum of two courses, which may be a field offered in another



Elliott School program, a field in an academic department, or a field in a specific issue area, such as space policy, trade policy, or environmental policy).

Students must demonstrate basic familiarity with concepts of economic theory, either by having taken prior course work beyond the introductory level or by taking Econ 217. Students must also satisfy a tool requirement in quantitative research, usually by successful completion of PAD 296 or Stat 105, 112, 118, or 183. In some cases, proficiency in a foreign language may be judged integral to the student's program of study; proficiency consists of reading knowledge as certified by the appropriate language department and will satisfy the tool requirement. Courses taken to fulfill the tool requirement may not be included in the 36 credit hours required for the degree.

The following graduate courses pertain to science, technology, and public policy.

- Econ 237 *Economics of the Environment and Natural Resources*
- Econ 255 *Economics of Technological Change*
- IAff 222 *Science, Technology, and Public Affairs*
- IAff 223 *Science, Technology, and International Affairs*
- Mgt 230 *Management of Research and Development*
- Mgt 232 *International Science and Technology*
- Mgt 233 *Emerging Technologies*
- Mgt 235 *Technological Entrepreneurship and Innovation*
- Mgt 239 *Seminar: Management of Research and Development*
- PSc 223 *Science, Technology, and Public Policy*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

#### SECURITY POLICY STUDIES

**Program Committee:** R. Spector (Director), R. Butterworth, S. Johnson, W.H. Lewis, B.M. Sapin

*Master of Arts in the field of security policy studies*—This interdisciplinary program, offered by the Elliott School of International Affairs, prepares individuals for professional careers in defense planning and programming, policy formulation and implementation, intelligence evaluation, and arms control specialties.

Prerequisite: the admission requirements stated under the Elliott School of International Affairs and a bachelor's degree in a related field. Required: the general requirements stated under the Elliott School. The program consists of 36 credit hours in three fields; there is no thesis option. All students must take four courses in the required core field of national security and defense analysis (PSc 248 or 249; IAff 253, 254; and one course in military history chosen from Hist 228, 229, 230). At least one field must be selected from the following. (1) International security policy (Hist 255–56; PSc 241, 257). (2) Military history (Hist 228, 229, 230). (3) Soviet military policy and strategy (Hist 255–56; PSc 268, 269). (4) Science, technology, and public policy (IAff 222, 223; PSc 223). (5) Applied quantitative techniques (IAff 255–56). (6) The legislative and budget process (PSc 218, 226). (7) History and politics of the Middle East (Anth 177; Hist 292, 294; PSc 276, 277, 278). (8) International economics (PSc 238, 239; Econ 202, 251, 252, 267, 268, 281, 282, 283, 284). Area concentrations in Latin America or East Asia may be selected in consultation with the advisor. The third field may also be selected from the above, or a special field may be designed in consultation with the advisor to suit a student's special interests. The three fields must represent at least two academic disciplines; no more than 24 hours of course work may be taken in any one department or discipline.

Students must pass Master's Comprehensive Examinations in each of their three fields. With permission of the program director, a student may substitute one specially designed field consisting of two courses and submit a research paper in lieu of one Comprehensive Examination.

Familiarity with economic theory and concepts at the level of Econ 217–18 is required. The tool requirement must be satisfied by demonstration of proficiency in statistics (at the level of Stat 105, 112, 118, or 183, or PAD 296) or reading knowledge of a modern foreign language (as certified by the appropriate language department).

In addition to the courses listed below, related courses in other disciplines may be taken with approval of the program director or an academic advisor.

The following graduate courses are applicable to security policy studies.

- Econ 239 *Economics of Defense*
- Econ 267 *Economies of the Former Soviet Union and Eastern Europe*
- Econ 268 *Economies of the Former Soviet Union and Eastern Europe in Transition*
- Econ 281 *International Trade Theory*
- Econ 282 *International Finance and Open-Economy Macroeconomics*
- Econ 283 *Survey of International Trade Theory and Policy*
- Econ 284 *Survey of International Macroeconomics and Finance Theory and Policy*
- Hist 228 *Modern Military and Naval History*
- Hist 229 *World War II*
- Hist 230 *Strategy and Policy*
- Hist 253-54 *History of Sino-Soviet Relations*
- Hist 255-56 *U.S.-Soviet Strategic Relations Since World War II*
- Hist 259-60 *U.S.-Soviet-Chinese Relations*
- Hist 292 *Israel, Zionism, and the Arab World*
- Hist 294 *Seminar: The Modern Near East*
- IAff 222 *Science, Technology, and Public Affairs*
- IAff 223 *Science, Technology, and International Affairs*
- IAff 253-54 *Defense Policy and Program Analysis*
- IAff 255-56 *Applied Quantitative Techniques*
- IAff 293 *Colloquium: National Defense Policies and Issues*
- PSc 203 *Approaches to Public Policy Analysis*
- PSc 204 *Methods of Public Policy Analysis*
- PSc 207 *Modern Political Thought and Ideologies*
- PSc 208 *Russian Political Thought*
- PSc 223 *Science, Technology, and Public Policy*
- PSc 226 *Budgetary Politics*
- PSc 238 *U.S. Foreign Economic Policy*
- PSc 239 *U.S. Foreign Economic Policy Making*
- PSc 240-41 *Theories of International Politics*
- PSc 244-45 *International Law*
- PSc 248-49 *U.S. National Security Policy*
- PSc 257 *Arms Control and Disarmament*
- PSc 258 *Communist Party of the Soviet Union*
- PSc 263 *Russia and Europe*
- PSc 268 *Post-Soviet Foreign Policies*
- PSc 269 *Post-Soviet Military Policies*
- PSc 276 *The Arab-Israeli Conflict*
- PSc 277 *Government and Politics of the Middle East*
- PSc 278 *International Relations of the Middle East*

Students should consult their advisors concerning certain Special Topics or Selected Topics courses that may also be part of this program.

## 700 SERIES

The 700 Series is made up of experimental or special courses that are on the cutting edge of the academic endeavor. Often, courses in the 700 Series focus on interdisciplinary or very current issues in a field. Because 700 Series courses change each semester, students should consult the *Schedule of Classes* for offerings. Courses are listed with the participating departments; course descriptions appear in a specially designated section of the *Schedule*.

Courses numbered 701 are in general studies, 721 courses are interdepartmental, 751 courses are interschool, and 770s are taught by University Professors and are listed in this Bulletin under the designation of University Professors. The program is coordinated by the Director of Summer Sessions and Experimental Programs.



## SOCIOLOGY

University Professor A. Etzioni

Professors R.W. Stephens, T.F. Courtless, Jr., P.H.M. Lengermann, R.A. Wallace, P. Langton, W.J. Chambliss

Adjunct Professors S.J. Rogers, W.V. D'Antonio

Associate Professors J.L. Tropea (Chair), S.A. Tuch, R. Weitzer

Adjunct Assistant Professor C. Deitch

*Master of Arts in the field of sociology*—Prerequisite: a bachelor's degree with a major in sociology or in an approved related field.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. With the approval of the advisor and of the Admissions/Advising Committee, students may elect one of the following programs: (1) at least 24 credit hours of graduate work plus a thesis (Soc 299–300) and satisfactory completion of a Master's Comprehensive Examination in sociological theory and social research methods; or (2) at least 33 credit hours of graduate course work, satisfactory completion of a Master's Comprehensive Examination in sociological theory, social research methods, and one area of specialization (criminology/sociology of law, gender, medical sociology/health policy, race and ethnicity). All candidates must satisfactorily complete Soc 230, 232, 238, and 239; Mgt 225 (or its equivalent); and 6 hours of graduate-level sociology courses chosen from one of the areas of specialization listed above. In either the thesis or nonthesis program, 6 hours may be taken outside the department.

- 210 **Theoretical Foundations of Political Sociology** (3) Lengermann  
Sociological theory on the relationship of politics to the wider social system. Emphasis on concepts of power, alienation, ideology, political stability, conflict, and change.
- 225 **Theories of Social Change** (3) Lengermann  
Review of sociological writings on modernity—its emergence in the North Atlantic societies, its consequences for third world societies, and its future.
- 230 **Sociological Research Methods** (3) Tuch  
Systematic survey of sociological research strategies and review of the literature in this area. Recommended for students with only one undergraduate course in research techniques. (Fall)
- 231 **Seminar: Advanced Research Methods** (3) Tuch  
Intensive study and evaluation of a few sophisticated research techniques and of new developments in the methodology of social research. Prerequisite: Soc 230; Mgt 225 or equivalent. (Spring)
- 232 **Qualitative Methodology: Doing Field Research** (3) Chambliss, Langton, Wallace, Weitzer  
Practical application of data collection methods in natural settings; observation, participant observation, and field experience. Emphasis on implementing research projects by using these methods for purposes of developing empirically grounded theory. (Fall)
- 235 **Seminar: Sociology of Education** (3) Wallace, Tropea  
Sociological theories on relationships between education and the economic, political, social, and cultural character of society; examination of social factors relating to such topics as educational achievement, the changing functions of educational structures, and the roles of teacher and student.
- 238 **Seminar: Development of Sociological Theory** (3) Lengermann  
Development of sociology from the early 1800s to the 1920s. Intensive analysis of the classical theoretical statements. (Fall)
- 239 **Seminar: Modern Sociological Theory** (3) Lengermann, Wallace  
Intensive examination and evaluation of contemporary schools of sociological theory in Europe and America. Advanced analysis of theoretical perspectives. Prerequisite: Soc 238. (Spring)
- 240 **Sociology of Work and Occupations** (3) Langton  
Review of major theoretical and empirical developments in industrial sociology; varying approaches to the study of work and occupations. (Fall)
- 241 **Sociology of Work and Organizations** (3) Langton  
Theory of complex organizations relative to work in industry, government, and business; examination of basic processes such as decision making, recruitment.

- allocation of authority, informal organization, and interorganizational relations. (Spring)
- 242 **Seminar: Medical Sociology (3)** Langton  
Study of the social structure of health care and the interplay of the various health professions; examination of social factors and processes related to the etiology and treatment of illnesses. Prerequisite: permission of instructor. (Fall)
- 243 **Health Policy Issues for Minorities, Women, and the Elderly (3)** Langton  
Analysis of health policy issues in the care of minorities, women, and the elderly; examination of sociocultural properties of policy-making and implementing; formulation of a critical perspective on policies and policy-making.
- 245 **Seminar: Race Relations (3)** Tuch  
Systematic analysis of race relations and inequality, primarily in the United States. Topics include current status and recent trends in inequality, the institutional and organizational patterning of discrimination, the structure of racial attitudes, theoretical perspectives on race relations, and selected policy issues. (Spring)
- 246 **Comparative Race and Ethnicity (3)** Weitzer  
Examination of race and ethnic relations in comparative, international perspective. Selected societies are analyzed in terms of patterns of racial and ethnic inequality, intergroup relations, institutional foundations of discrimination, social control systems, and sources of social change.
- 258 **Seminar: Deviance and Control (3)** Weitzer  
Examination of major theories and research in the field of deviance and social control, with special emphasis on recent empirical advances and comparative perspectives.
- 259 **Law and Criminology: Search for the Causes of Criminal Behavior (3)** Chambliss, Courtless, Tropea  
The role that criminological knowledge of crime causation may play in developing effective alternative social and legal devices in controlling deviant behavior. Same as Law 478. (Fall)
- 261 **Law of Criminal Corrections: Society's Response to the Criminal Offender (3)** Chambliss, Courtless, Tropea  
Study of the development and current use of society's three major approaches to the handling of offenders: punitive, incapacitating, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior; research findings concerning effectiveness of these responses. Same as Law 479. (Spring)
- 263 **Seminar: Law and Society (3)** Chambliss, Courtless  
Selected problems in law as an instrument of social policy; emphasis on the organization of legal decision-making processes.
- 265 **Selected Topics in Criminal and Juvenile Justice Policy (3)** Chambliss, Courtless, Tropea  
Development of a systematic perspective on policies affecting the juvenile and criminal justice systems. Topics will include adjudication, disposition, diversion, and sentencing. (Spring, even years)
- 271 **Seminar: Gender and Society (3)** Lengermann, Wallace  
An examination of quantitative and qualitative research in the field of gender, with emphasis on current empirical research. (Fall, even years)
- 272 **Seminar: Theoretical Perspectives on Gender (3)** Lengermann, Wallace  
Review of significant theoretical writings on gender and gender inequality, with a primary focus on contemporary sociological statements. (Spring, odd years)
- 280 **The Sociology of Aging (3)** Staff  
Impact of current demographic changes (size and composition of the aged population) on the existing structure of American society.
- 281 **Problems of Growing Old in American Society (3)** Staff  
Analysis of the bases of the social status of the aged in American society, the impact on older people of characteristic situational changes in later life, and societal responses to those impact areas defined as social problems.
- 290 **Principles of Demography (3)** Boulier  
Same as Econ/Geog/Stat 290.
- 291 **Methods of Demographic Analysis (3)** Boulier  
Same as Econ/Geog/Stat 291.



- 295 Research (arr.)** Staff  
Independent study and special projects. Before permission is granted to register for Soc 295, the student must submit a written plan of study for the approval of the staff member of the department who will be directing the research. May be repeated once for credit. (Fall and spring)
- 299-300 Thesis Research (3-3)** Staff
- 332 Seminar: Processes of Inquiry (3)** Staff  
Development and critical review of students' research projects with the objectives of aiding conceptualization and developing research design. Consideration of the interplay between theory and methods. Prerequisite: at least 3 credit hours each of graduate theory and graduate methods. May be repeated for credit.
- 338 Advanced Seminar:** Chambliss, Lengermann, Wallace  
**Classical Sociological Theory (3)**  
Intensive investigation of special topics in classical sociological theory. Prerequisite: Soc 238 or its equivalent or permission of instructor. (Spring)
- 339 Advanced Seminar:** Chambliss, Lengermann, Wallace  
**Modern Sociological Theory (3)**  
Intensive investigation of special topics in modern sociological theory. Prerequisite: Soc 239 or its equivalent or permission of instructor. (Fall)
- 342 Advanced Seminar on Health Policy (3)** Langton  
Review of how health policy is made and implemented; how health policy research is done; in-depth review of selected topics and completed policy studies, primarily for students in the medical/health policy field. Prerequisite: Econ 248, Soc 242 or consent of the instructor. (Spring)
- 352 Selected Topics (3)** Staff  
Intensive investigation of special topics in sociological research. May be repeated for credit. (Spring)
- 398 Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit.
- 399 Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## SPECIAL EDUCATION

See Teacher Preparation and Special Education.

## SPEECH AND HEARING

**Professors** J.W. Hillis, L.S. Bowling, C.W. Linebaugh (Chair)  
**Associate Professors** M.D.M. Brewer, J.R. Regnell, W.P. Cupples  
**Associate Professorial Lecturers** L.B. Beck, J.D. Schafer  
**Assistant Professorial Lecturer** C.L. Person  
**Assistant Clinical Professor** L.O. Shekim  
**Clinical Instructors** S.H. Fantom, L. Jacobs-Condit, P. Mason, A.A. Pietranton, R.T. Walton, S. Yaffe-Oziel, C. Feldman

*Master of Arts in the field of speech-language pathology and audiology*—Prerequisite: the degree of Bachelor of Arts with a major in speech and hearing science from this University, or an equivalent degree, and an appropriate score on the Aptitude Test of the Graduate Record Examination.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences. The program of study consists of 39 credit hours of approved course work without a thesis or, with the approval of the department, 30 credit hours of approved course work plus a thesis (SpHr 299-300). All students must satisfy the academic and supervised practicum requirements of the Certificate of Clinical Competence awarded by the American Speech-Language-Hearing Association and satisfactorily complete the Master's Comprehensive Examination.

As one component of the Master's Comprehensive Examination, all students must take the National Examination in Audiology or in Speech Pathology available through the Educational Testing Service. Students must request the Testing Service to send copies of test scores to the Department of Speech and Hearing to be used in partial fulfillment of the

general requirement in the Graduate School for the Master's Comprehensive Examination. Test results must reach the department at least three weeks before graduation.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

- 201 Clinical Practicum in Communication Disorders** (1 to 3) Bowling, Cupples  
Supervised clinical practice in the evaluation and treatment of speech, language, and hearing disorders; development of treatment plans and writing of evaluation and progress reports. Admission by permission of the instructor. May be repeated for up to 6 credit hours. (Fall, spring, and summer)
- 210 Research Methods in Speech and Hearing** (3) Hillis  
Methods for the design and execution of research in speech and hearing. Topics include literature review, measurement, hypothesis formulation, experimental control, and data analysis. Laboratory fee, \$12. (Spring)
- 220 Disorders of Articulation and Phonology** (3) Staff  
Survey of the nature and causes of impairments of speech sound production in children and adults. Differential diagnosis of oral motor versus phonological disorders; treatment approaches; identification and modification of regional dialects and foreign accents. Laboratory fee, \$12. (Fall)
- 221 Neurodevelopmental Disorders of Speech Production** (3) Person  
Evaluation and treatment of infants and children with neurodevelopmental speech disorders, including cerebral palsy and developmental apraxia of speech. Emphasis on management of prespeech oral motor and feeding impairments. Laboratory fee, \$12. (Summer)
- 222 Neuromotor Disorders of Speech Production** (3) Linebaugh  
Methods for assessing acquired neuromuscular speech disorders and their physical, acoustic, and perceptual characteristics. Differential diagnosis and treatment of apraxia of speech, the dysarthrias, and other neuromotor disorders. Laboratory fee, \$12. (Spring)
- 230 Pediatric Language Impairments I** (3) Cupples  
Survey of current approaches for assessing and treating language delays and disorders in infants, toddlers, preschoolers, school-age children, and adolescents. Review of standardized, observational, and ethnographic approaches used in language assessment; current models of intervention and service delivery. Laboratory fee, \$12. (Fall)
- 231 Pediatric Language Impairments II: Early Intervention** (3) Cupples  
In-depth study of theoretical and practical approaches for assessing and treating language impairments in infants, toddlers, and preschool children. Methods used in family needs assessment, Individualized Family Service Plans, and ethnographic assessment; models of team functioning and ecologically valid procedures for language intervention. Laboratory fee, \$12. (Spring)
- 232 Pediatric Language Impairments III: School-Age Children and Adolescents** (3) Cupples  
In-depth study of theoretical and practical approaches for assessing and treating language impairments in elementary, middle, and high school students. Review of curriculum-based and dynamic assessment procedures, models of collaboration and consultation, types of discourse, literacy, and meta-knowledge. Laboratory fee, \$12. (Summer)
- 240 Clinical Aphasiology** (3) Linebaugh  
Current neurolinguistic theories. Differential diagnosis and clinical management of aphasia and communicative impairments resulting from right cerebral hemisphere damage, traumatic brain injury, and dementia. Laboratory fee, \$12. (Fall)
- 241 Applied Neurolinguistics** (3) Linebaugh  
Neurolinguistic and cognitive processes of language formulation and comprehension. Application of neurolinguistic models to neurogenic communicative disorders. (Summer)
- 250 Evaluation and Treatment of Speech Fluency Disorders** (3) Hillis  
Procedures for clinical assessment of stuttering and other disorders of speech rate and rhythm. Review of historical and current methods for treatment. Laboratory fee, \$12. (Spring)



- 251 **Seminar: Speech Fluency Disorders** (3) Hillis  
Consideration of stuttering and other disorders of speech rate and rhythm from developmental, linguistic, physiological, and psychosocial points of view. (Fall)
- 260 **Evaluation and Treatment of Voice Disorders** (3) Regnell  
Normal anatomy and physiology of the human vocal mechanism. Nature, causes, and clinical management of functional and organic voice disorders, including laryngectomy. Laboratory fee, \$12. (Fall)
- 261 **Seminar: Voice Disorders** (3) Regnell  
Advanced study of selected theoretical and clinical issues regarding voice disorders. (Summer)
- 270 **Clinical Audiology I** (3) Schafer  
Psychoacoustic principles and methods underlying the assessment of auditory disorders. Anatomy and physiology of the auditory mechanism. Laboratory fee, \$12. (Fall)
- 271 **Clinical Audiology II** (3) Schafer  
Audiological assessment of middle ear function, speech audiometry, and management of diagnostic information. Laboratory fee, \$12. (Fall)
- 272 **Pediatric Audiology** (3) Bowling  
Embryologic development of the auditory mechanism. Nature and causes of auditory impairments; audiometric techniques used to measure hearing in children. Laboratory fee, \$12. (Spring)
- 273 **Electrophysiologic Assessment of Hearing** (3) Schafer  
Study of electrophysiologic techniques used to assess cochlear and retrocochlear function. Theories and clinical applications of vestibular tests, auditory brain-stem-evoked responses, and electrocochleography. Laboratory fee, \$12. (Spring)
- 274 **Central Auditory Processes** (3) Bowling  
Factors affecting auditory perception and comprehension. Identification and clinical management of central auditory processing disorders in children and adults. Laboratory fee, \$12. (Fall)
- 275 **Industrial Audiology** (3) Bowling  
Theories and processes pertinent to communicative disorders related to industrial noise. Consideration of hearing conservation programs, environmental assessment, and relevant legislation. (Fall)
- 276 **Aural Rehabilitation** (3) Brewer  
Habilitation/rehabilitation of the hearing impaired, including auditory training, speech reading, hearing aids, assistive listening devices, communication strategies, and counseling. Laboratory fee, \$12. (Fall)
- 277 **Psychoeducational Management of the Hearing Impaired** (3) Brewer  
Study of the psychosocial and educational effects of hearing loss. Assessment, remediation, and management approaches related to the education of the hearing impaired. Laboratory fee, \$12. (Summer)
- 278 **Hearing Aids** (3) Beck  
Discussion of hearing-aid characteristics and electroacoustic measurements; hearing-aid effectiveness in improving communicative efficiency; procedures for selection and clinical evaluation of hearing aids; counseling of the patient. Laboratory fee, \$12. (Spring)
- 285 **Management of Clinical Services in Communication Disorders** (3) Staff  
Planning, management, and operation of clinic, hospital, school, and private practice services in speech-language pathology and audiology. Consideration of personnel, financial, and space issues; ethical and legislative concerns. (Fall)
- 290 **Selected Topics in Clinical Audiology** (1 to 3) Bowling  
Advanced study of selected theoretical and clinical issues. May be repeated, but may not be taken for more than a total of 3 credit hours of credit. (Fall, spring, and summer)
- 291 **Selected Topics in Speech-Language Pathology** (1 to 3) Staff  
Advanced study of selected theoretical and clinical issues regarding various aspects of practice in speech-language pathology. May be repeated but not for more than a total of 6 credit hours. (Fall, spring, and summer)
- 295 **Independent Research in Speech, Language, and Hearing** (arr.) Staff
- 299-300 **Thesis Research** (3-3) Staff

**STATISTICS/COMPUTER AND INFORMATION SYSTEMS**

Professors H.W. Lilliefors, A.D. Kirsch (Chair), J.L. Gastwirth, S.W. Greenhouse (Emeritus), N.D. Singpurwalla, R.T. Smythe, J.M. Lachin III, K.K.G. Lan, J.I. Verter (Research)  
Professorial Lecturers W.R. Nunn, N. Kirkendall, F. Scheuren  
Associate Professors H.M. Mahmoud, T.K. Nayak, R.P. Bain (Research)  
Associate Professorial Lecturer J.S. Wu  
Assistant Professors D.A. Grier, B. Toman, C. Hurley, S. Bose, R. Modarres-Hakimi, C.H. Chen, R. Orlandic (Visiting)  
Assistant Professorial Lecturers P. Chandhok, D. Malec

*Master of Science in the field of applied statistics, Master of Science in the field of statistical computing, or Master of Arts in the field of mathematical statistics*—The program of study consists of 30 to 36 credit hours of course work without a thesis. In exceptional cases the department may approve a program of study consisting of 24 to 30 credit hours of course work plus a thesis (Stat 299–300). Candidates must pass a written Master's Comprehensive Examination. For prerequisites and additional requirements, see below.

*Master of Science in the field of applied statistics*—Two options are provided: a general curriculum in applied statistics and a concentration in biostatistics. Prerequisite: course work in multivariable calculus, linearity and matrices, and regression analysis (Math 33 and 124; Stat 118).

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences and 30 to 36 credit hours of course work. If the student has not previously had a course in analysis of variance (Stat 119), the program must include Stat 221 or 217. Courses are selected in consultation with the advisor.

(a) *General curriculum in applied statistics*—The core curriculum includes Stat 201–2 and 210. An additional 21 credit hours must be chosen in consultation with the advisor.

(b) *Concentration in biostatistics*—The core curriculum includes Stat 187 (Introduction to Sampling), 201–2, 210, 225–26, 227, 231. Twelve additional credit hours are electives of which 6 hours must be in statistics and 6 hours must be in health sciences or related areas. All electives must be approved by the advisor.

*Master of Science in the field of statistical computing*—Prerequisite: course work in multivariable calculus, linearity and matrices, regression analysis, computer programming, data structures and algorithms, and discrete structures (Math 33 and 124; Stat 118, 130, 131, 132); or demonstrated proficiency in advanced programming techniques.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences and 30 to 36 credit hours of course work. The 24-hour core consists of 201–2, 203, 204, 207–8, 210, and 283. Students entering the program without a strong background in statistics will be expected to take at least 3 credit hours of options in statistics.

*Master of Arts in the field of mathematical statistics*—Prerequisite: a bachelor's degree with a major in statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent required courses, those courses must be taken as prerequisite to graduate study. Additional prerequisites include advanced calculus (Math 139 and 140). Under certain circumstances some prerequisites may be waived; check with the department.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including Stat 201–2 and 217–18. The remaining 18 credit hours must be selected in consultation with the advisor.

*Master of Science in the field of industrial and engineering statistics*—The program is offered jointly by the Department of Statistics Computer and Information Systems and the Department of Operations Research. Students will apply either to Columbian College and Graduate School of Arts and Sciences or the School of Engineering and Applied Science, but must be admissible to both; see the respective school sections for entrance requirements.

Prerequisite: Applicants must have demonstrated knowledge of multivariable calculus, computer programming, linearity and matrices, and probability and statistics, including regression. This program prerequisite can be met by completion of ApSc 115, CSci 100, Math 33 and 124, and Stat 118 (see the Undergraduate Programs Bulletin). Should prerequisite courses be assigned, they may be taken concurrently with graduate courses; credit for prerequisite courses does not apply toward the degree.



Required: The general requirements stated under Columbian College and Graduate School of Arts and Sciences and the School of Engineering and Applied Science. The degree requires a minimum of 33 credit hours, including the core courses OR 254, 281, 282 and Stat 201, 202, 217; two courses chosen from OR 262, OR 273, Stat 173, OR 371, Stat 223, OR Stat 284; and two elective courses approved by the advisor, generally chosen from EE 208, OR 277 or 279, and Stat 188, 218, 289. Candidates must pass a Master's Comprehensive Examination.

*Doctor of Philosophy in the field of statistics*—Prerequisite: A master's degree in statistics or a related discipline. The main requirement is a strong background in mathematics, including courses in advanced calculus, linear algebra, and mathematical statistics (similar to Stat 201–2). Some deficiencies may be made up concurrently during the student's first year. In some instances, a student may enter the Ph.D. program with a bachelor's degree.

Required: The general requirements stated under Columbian College and Graduate School of Arts and Sciences, including satisfactory completion of (1) Stat 201–2, 217–18, 223 or 271, 257, 258, 263, 264, and at least two courses chosen from among Stat 262, 265–66, and 273–74; (2) a minimum of 18 additional credit hours as determined by consultation with the departmental doctoral committee; (3) proficiency in computer languages as demonstrated by course work or an examination; (4) the General Examination, consisting of two parts: (a) a written qualifying examination that must be taken within 24 months from the date of enrollment in the program and is based on the four-course core (Stat 257, 258, 263, 264) and (b) an examination to determine the student's readiness to carry out the proposed dissertation research; and (5) a dissertation demonstrating the candidate's ability to do original research in one of the following fields: Bayesian inference, biostatistics, design of experiments, multivariate analysis, nonparametric statistics, probability (theoretical or applied), reliability theory, robust methods, sampling, statistical computing, statistical inference, stochastic processes, and time series.

With permission, a limited number of 100-level courses in the department may be taken for graduate credit; additional course work is required. See the Undergraduate Programs Bulletin for course listings.

**201–2 Mathematical Statistics (3–3)**

Lilliefors, Smythe

Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: Math 33 and 124. (Academic year)

**203 Fundamental Algorithms and Their Analysis (3)**

Mahmoud

Basic tools for the study of algorithms, including asymptotic analysis and recurrence relations. Graphs and their representation in a computer. Some NP-complete graph problems. Open to qualified seniors. Prerequisite: Math 124; Math 113; Stat 131.

**204 Expert Systems (3)**

Staff

Advanced study of machine intelligence, with special emphasis on expert systems. Topics include advanced systems for problem solving and automated reasoning, reasoning in the presence of uncertainty, search control, backward and forward rule chaining, connectionist artificial intelligence. Prerequisite: Stat 147. (Spring)

**206 Multivariate Methods in the Behavioral Sciences (3)**

Kirsch

Application of multivariate analysis to data of the social sciences. Techniques covered include factor analysis, cluster analysis, discriminant analysis, and other topics. Prerequisite: Stat 105 or 118, and prior permission of the instructor. Not open to graduate students in statistics.

**207 Methods of Statistical Computing I (3)**

Lilliefors

Error analysis, computational aspects of linear models, sweep operator, random number generation, simulation, resampling. Optimization, numerical integration (Gaussian quadrature, Simpson's rule); E-M algorithm. Prerequisite: Stat 118, 157–58; Math 124; knowledge of a programming language.

**208 Methods of Statistical Computing II (3)**

Grier, Hurley

Numerical linear algebra, matrix decomposition and eigenvalue problems. Smoothing and density estimation. Graphics, interactive and dynamic techniques for data display. Object-oriented programming. Prerequisite: Stat 118, 157–58; Math 124; and knowledge of a programming language.

- 210 Data Analysis (3)** Lachin  
A study of statistical methods for data analysis, using computerized statistical procedures. Multiple regression and the general linear model, discrimination and classification, the analysis of contingency tables, and nonparametric methods. Prerequisite: Stat 118 and either Stat 183 or 197 or demonstrated proficiency in computer programming. (Spring)
- 215-16 Applied Multivariate Analysis (3-3)** Staff  
Application of multivariate statistical techniques to multidimensional research data from the behavioral, social, biological, medical, and physical sciences. Prerequisite: Stat 119, 157-58, and Math 124. (Alternate academic years)
- 217-18 Advanced ANOVA and Experimental Design (3-3)** Toman  
Advanced theory and application of general linear parametric model to experimental designs, estimation, and hypothesis testing. Prerequisite: Stat 157-58 or 201-2; Math 124. (Academic year)
- 221 Design of Experiments for Behavioral Sciences (3)** Kirsch, Toman  
Applications of advanced experimental design to research problems in behavioral sciences and education. Prerequisite: Stat 105 or 118 or equivalent and permission of instructor. Not open to graduate students in mathematical statistics. (Spring)
- 223 Bayesian Statistics: Theory and Applications (3)** Singpurwalla, Toman  
An overview of Bayesian statistics, including its foundational issues, decision under uncertainty, linear models, expert opinion, and computational issues. Prerequisite: Stat 201-2.
- 225 Fundamentals of Biostatistics (3)** Lachin, Lan  
Statistical methods for the design and analysis of biomedical research studies, including the randomized clinical trial and other observational and epidemiological studies. Evaluation of power and sample size, randomization, analysis of binary data and logistic regression. Prerequisite: Stat 201-2 or permission of instructor. (Fall, alternate years)
- 226 Advanced Biostatistics (3)** Lachin, Lan  
Parametric and nonparametric statistical methods for the analysis of longitudinal data (repeated measures). Empirical Bayes methods. Methods for sequential analysis of emerging data, including group sequential analysis. Bayesian methods, and stochastic curtailment. Prerequisite: Stat 201-2 or permission of instructor. (Spring, alternate years)
- 227 Survival Analysis (3)** Lachin, Lan  
Parametric and nonparametric methods for the analysis of events observed in time (survival data), including Kaplan-Meier estimate of survival functions, logrank and generalized Wilcoxon tests, the Cox proportional hazards model and an introduction to counting processes. Prerequisite: Stat 201-2 or permission of instructor. (Fall, alternate years)
- 231 Contingency Table Analysis (3)** Staff  
A study of the theoretical bases underlying the analysis of categorical data. Prerequisite: Stat 201-2 or 257-58.
- 257 Probability (3)** Smythe  
Probabilistic foundations of statistics, probability distributions, random variables, moments, characteristic functions, modes of convergence, limit theorems, probability bounds. Prerequisite: Stat 201-2, knowledge of calculus through functions of several variables and series. (Fall)
- 258 Distribution Theory (3)** Gastwirth  
Special distributions of statistics, small and large sample theory, order statistics, and spacings. Prerequisite: Stat 257. (Spring)
- 259-60 Advanced Mathematical Probability (3-3)** Smythe  
Measure theory, probability spaces, random variables, probability distributions, sequences and sums of random variables, conditioning, limit theorems, martingales. Prerequisite: advanced calculus and permission of instructor. (Alternate academic years)
- 261 Sequential Design and Analysis (3)** Staff  
Wald's theory of sequential designs, optional stopping, choice of sequential experiments. Prerequisite: Stat 201-2.
- 262 Nonparametric Inference (3)** Staff  
Inference when the form of the underlying distribution is unspecified. Prerequisite: Stat 201-2.



- 263 Advanced Statistical Theory I (3)** Nayak  
Linear models, decision theoretic estimation, classical point estimation. Prerequisite: Stat 201-2. (Fall)
- 264 Advanced Statistical Theory II (3)** Nayak  
Asymptotic theory, hypothesis testing, confidence regions. Prerequisite: Stat 201-2, 257. (Spring)
- 265 Multivariate Analysis (3)** Nayak  
Multivariate normal distribution. Hotelling's  $T^2$  and generalized  $T^2$ . Wishart distribution, discrimination and classification. Prerequisite: Stat 201-2 and Math 124.
- 266 Topics in Multivariate Analysis (3)** Staff  
Multivariate analysis of variance, principal components, canonical correlation, factor analysis. Prerequisite: Stat 265.
- 271 Foundational and Philosophical Issues in Statistics (3)** Singpurwalla  
Axiomatic underpinnings of Bayesian statistics, including subjective probability, belief, utility, decision and games, likelihood principle, and stopping rules. Examples from legal, forensic, biological, and engineering sciences. Students are expected to have a background in computer science, economics, mathematics, or operations research. Prerequisite: Stat 201-2.
- 273-74 Stochastic Processes (3-3)** Staff  
Fundamental notions of Markov chains and processes, generating functions, recurrence, limit theorems, random walks, Poisson processes, birth and death processes, applications. Prerequisite: Stat 189-90, and 201-2 or 257-58. (Alternate academic years)
- 275 Econometrics I: Introduction (3)** Staff  
Same as Econ 275. (Fall)
- 276 Econometrics II: Simultaneous Equations Models (3)** Staff  
Same as Econ 276. (Fall)
- 281 Advanced Time Series Analysis (3)** Wu  
Autoregressive integrated moving average (ARIMA) modeling and forecasting of univariate and multivariate time series. Statespace or Kalman filter models, spectral analysis of multiple time series. Theory and applications using the University computer. Prerequisite: Math 33, Stat 201-2 or equivalent. (Spring)
- 283 Advanced Statistical Packages (3)** Grier  
Use of advanced computer systems to solve statistical problems. Macro programming, multivariate analysis, exploratory data analysis, interactive computer graphics, symbolic mathematics. Examples of possible packages include GLIM, S, SAS, Mathematica. Prerequisite: Stat 183 or 210 or permission of instructor. (Alternate academic years)
- 284 Computer-Intensive Methods in Industrial and Engineering Statistics (3)** Singpurwalla, Toman  
Computer-aided design and analysis of industrial experiments, including factorial, Taguchi, and other designs. Analysis of survival, reliability, and quality control data, including reliability growth and point processes. Simulation techniques in reliability analysis. Corequisites: OR 281, Stat 217. (Fall, odd years)
- 287-88 Modern Theory of Sample Surveys (3-3)** Staff  
Application of statistical theory to the sampling of finite populations. Simple, stratified, cluster, double and subsampling. Special topics, including superpopulations and randomized response. Prerequisite: Stat 91 and Math 32 or equivalent. (Academic year)
- 289 Seminar (3)** Staff  
Admission by permission of instructor. (Fall and spring)
- 290 Principles of Demography (3)** Staff  
Same as Econ 290.
- 291 Methods of Demographic Analysis (3)** Staff  
Same as Econ 291.
- 295 Reading and Research (3)** Staff  
May be repeated once for credit.
- 298 Seminar: Special Topics (3)** Staff
- 299-300 Thesis Research (3-3)** Staff  
(Fall and spring)

- 378 **Seminar: Topics in Econometrics (3)** Staff  
Same as Econ 378.
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to students preparing for the Doctor of Philosophy general examination.  
May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to Doctor of Philosophy candidates. May be repeated for credit.

## STRATEGIC MANAGEMENT AND PUBLIC POLICY

Professor H.J. Davis

Professorial Lecturers D.M. Devaney, J.H. Joseph

Associate Professors D.J. Lenn (Chair), J.B. Thurman, J. Cook, E.J. Englander, J.H. Beales III

Associate Professorial Lecturer W.N. LaForge

Assistant Professors D.R. Kane, R.M. LeNoir, L. Burke, M. Starik, M. Mallott

Assistant Professorial Lecturer M.N. Richburg

See the School of Business and Public Management for programs of study in business administration leading to the degrees of Master of Business Administration and Doctor of Philosophy.

- 201 **Business and Public Policy (3)** Lenn, Englander, Mallott  
This course is a First-Level requirement for M.B.A. students; it may not be used to satisfy a Second-Level requirement. Political, legal, economic, social, and ethical forces acting on business. Interaction of the market system and public policy process in the development of law and regulation. (Fall, spring, and summer)
- 202 **Business-Government Relations (3)** Lenn, Englander  
Historical and philosophical foundations of the business-government relationship. Regulation, international trade, and corporate political activities. Public policy issues facing business and the business community's political response. Prerequisite: SMPP 201 or equivalent. (Fall and spring)
- 203 **Federal Government Regulation of Society (3)** Tolchin  
Same as PAd 216.
- 205 **Business Representation and Lobbying (3)** Joseph  
Strategies, tactics, and techniques used by business in representing itself to the legislative and executive branches and regulatory agencies of the federal government. Legal and practical constraints. Ethical considerations. (Fall)
- 206 **Applied Microeconomics (3)** Beales  
Applications of economic theory to public and private decisions with emphasis on public policy analysis. Focus on market structure and its implications. Imperfect information, common property, public goods and externalities. Economic analysis of government behavior and legal institutions. Prerequisite: Econ 217 and Mgt 270 or equivalents. (Spring)
- 208 **Macroeconomic Policy and Business (3)** Beales  
Determination of national income, employment, inflation, and interest rates. The role of expectations in the economy. Impact of government purchases, tax policy, and deficits. Monetary policy institutions. The global economy and exchange rates. Prerequisite: Econ 218 and Mgt 270 or equivalents. (Fall)
- 209 **Seminar: Business Economics and Public Policy (3)** Lenn, Englander  
Analysis and discussion of selected issues by students and representatives of government and business. Prerequisite: SMPP 201, 202, or equivalent. (Spring)
- 290 **Special Topics (3)** Staff  
Experimental offering; new course topics and teaching methods. May be repeated once for credit.
- 291 **Ethics and Business (3)** Lenn, Griffith  
Concepts and strategies of ethical analysis applied to specific business problems, e.g., risk management, plant relocation, preferential hiring, political advertising; development of theory of corporate social responsibility. Same as Phil 235. (Spring)
- 292 **New Venture Initiation (3)** Staff  
Theory, history, and practice of entrepreneurship and small business management. Essentials of planning a new business venture, sources of financing.



- evaluation of alternative new business ventures, and analysis of business functions needed to get started. Prerequisite: Completion of Common Body of Knowledge courses. (Fall and spring)
- 293 **American Business History (3)** Becker  
The history of American business institutions in manufacturing, distribution, transportation, and finance. Particular attention will be given to the period since industrialization, with consideration of business institutions in their economic, legal, governmental, and social contexts. Same as Hist 220. (Fall)
- 295 **Research Methods (3)** Davis  
Theory and practice in research methodology. Data sources and gathering, research models and designs, analysis and testing, controls, interpretation and presentation of findings. Use of computer library programs and preparation of a formal business report. (Fall)
- 297 **Strategy Formulation and Implementation (3)** Davis, Thurman, Cook, LeNoir, Starik  
An integrative approach to strategic management, stressing the general manager's perspective. Strategy formulation, implementation of strategy and policy, and evaluation and control of strategy in various types of organizations. Prerequisite: M.B.A. degree status. (Fall, spring, and summer)
- 298 **Directed Readings and Research (3)** Staff  
Supervised readings or research. Admission by prior permission of instructor. May be repeated once for credit. (Fall and spring)
- 299 **Thesis Seminar (3)** Staff
- 300 **Thesis Research (3)** Staff
- 311 **Seminar: Public-Private Sector Institutions and Relationships (3)** Staff  
An analysis and critique of alternative theoretical frameworks for describing, understanding, and predicting the nature, values, and actions of American public and private institutions. Problems, potentials, and alternatives for structuring public and private institutional arrangements to meet the needs of society. Prerequisite: doctoral degree candidate status. (Fall and spring)
- 301 **Seminar: Business Management (3)** Staff  
Examination of major current issues, both theoretical and empirical, affecting the development of the business enterprise. Topics to be announced. Emphasis on policy and strategic issues affecting the total enterprise. (Offered as the demand warrants)
- 398 **Advanced Reading and Research (arr.)** Staff  
Limited to doctoral candidates preparing for the general examination. May be repeated for credit.
- 399 **Dissertation Research (arr.)** Staff  
Limited to doctoral candidates. May be repeated for credit.

#### TEACHER PREPARATION AND SPECIAL EDUCATION

Professors R.K. Ives, J.R. Shotel, M.S. Castleberry, R.N. Ianacone, G.L. Horrworth, A.J. Mazur, N.J. Belknap, M.B. Freund (Chair), L.L. West, F.E. Hesser  
Associate Professors J.M. Taymans, L.R. Putnam, N.B. Paley, M.H. Futrell  
Assistant Professors S.S. Beck, L.H. Mauro, H.S. Hunter-Boykin, C.W. Brown, S.J. Lynch, K.A. Steeves, P.S. Christensen, C.A. Kochhar, A. Martinez, C.J. Hansen (Visiting), B.C. Browne (Visiting)  
Adjunct Assistant Professors S.M. Cahill, P. Dupont, S. Kostaki-Gailey, G. Schwartz, C. Rothenbacher, J.K. Beam, G. Tilson, V. Rab  
Instructor M. Lopes (Visiting)  
Adjunct Instructors M.A. Lucia, A.M. Solomon, J.A. Wagner, P. LeConte, S.S. Magula, J. Barton, J.L. Findley

See the School of Education and Human Development for programs of study leading to the degrees of Master of Arts in Education and Human Development, Master of Education, and Doctor of Education.

#### TEACHER EDUCATION

Department prerequisite: A bachelor's degree from an accredited institution is prerequisite to all 200-level courses in teacher education.

- 204 Social Issues in Education and Human Services (3)** Paley  
Historical and social development of education and human services; evolution of American education related to the growth of the nation and the changing social order; examination of selected issues in contemporary education and human services.
- 205 Foundations of Curriculum Development: K-12 (3)** Staff  
For experienced teachers. Curriculum research and design, issues and trends, comparison of curriculum patterns, curriculum development in subject areas, and consideration of current field-related problems. (Fall)
- 206-7 Teaching and Learning (3-3)** Staff  
An overview of the principles of teaching, learning, and related research. Explores ways of knowing, models of teaching, and the dynamic nature of the teaching/learning process. Structured observations and microteaching labs are required. Material fee, \$10 per semester.
- 208 Development and Diversity (3)** Staff  
An examination of student diversity in relation to theories of human growth and development. Investigation of diverse student strengths and needs based on cultural, gender, and disability factors as related to the teaching/learning process. Material fee, \$20.
- 209 Children's Literature (3)** Putnam  
Landmark works in the various genres of children's literature; strategies for integrating literature into the school curriculum. (Spring)
- 211 Elementary School Curriculum and Methods (2 to 5)** Beck, Paley  
A comprehensive block course with subsections in mathematics, science, language arts, social studies, music, art, and physical education. Pre-student teaching three days a week. Admission by permission of advisor. Material fee, \$10 per subsection.
- 216 Recent Developments in Teaching Social Studies (3)** Steeves  
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of social studies. Admission by permission of instructor.
- 217 Recent Developments in Teaching Science (3)** Lynch  
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of science. Admission by permission of instructor.
- 218 Recent Developments in Teaching Mathematics (3)** Hunter-Boykin  
For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective teaching of mathematics. Admission by permission of instructor.
- 220 Selected Topics (arr.)** Staff  
Topics and fees announced in the *Schedule of Classes*.
- 221 Developmental Reading: Emergent Literacy (3)** Putnam  
Focus on research into the literacy experiences and emergent reading and writing behaviors of young children in the first six years of life, along with implications for developing "literate environment" preschool and kindergarten classrooms.
- 222 Foundations of Reading Development: K-Adult (3)** Horrworth  
Basic theories and processes of reading acquisition and development; linguistic, cognitive, developmental, social, and affective bases of reading; varieties and influences of media and instructional strategies.
- 223 Reading Instruction in Content Areas: Elementary, Intermediate, and Secondary Schools (3)** Horrworth  
Emphasis on basic group instructional methods and media; teaching demonstrations of basic reading and study skills in content subjects; study of readability of content materials; research and application of formulas. (Fall)
- 224 Diagnostic Teaching of Reading: K-6 (3)** Horrworth  
Classroom teaching and testing techniques for elementary teachers; administration, scoring, and interpretation of informal tests and other measures of evaluation; selecting and planning activities suitable for correction of specific problems. Prerequisite: at least one previous course in reading. (Spring)
- 225 Measuring Mental Functions (3)** Johnson  
Administering, scoring, interpreting, and reporting the Wechsler Intelligence Scale for Children-Revised (WISC-R) and the Wechsler Intelligence Scale for Adults-Revised (WAIS-R). Material fee, \$25. (Fall and spring)



- 226 **Diagnostic Teaching of Reading in Secondary School** (3) Horrworth  
Application of instructional strategies and techniques presented in Educ 223 and 224. Construction of informal tests; administering, scoring, and interpreting informal and standardized tests; study and evaluation of materials; teaching strategies for on-grade students and for those with reading problems. (Spring)
- 227 **Current Issues in Elementary Education** (3) Beck  
Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school. (Fall)
- 228 **Instructional Areas in Elementary Education** (3) Beck  
Current trends and research in reading, language arts, social studies, mathematics, science, music, art, and physical education. (Spring)
- 230 **Foundations of Early Childhood Education** (3) Staff  
Historical developments; philosophy and objectives of nursery schools, kindergartens, and day care centers; exploration of contemporary programs and models, with curriculum implications for schools in the United States and abroad. (Fall)
- 231 **Community Resources and Materials for the Young Child** (3) Staff  
Interaction with community agencies for service, resources, and equipment; physical facilities, play activities, curriculum materials, and methods for teaching the infant and young child. (Spring)
- 232 **Early Childhood Curriculum** (3) Staff  
Rationale, development, content, approaches, programs, and materials in language arts, mathematics, science, health, social studies, and aesthetic education. (Fall)
- 233 **Role of the Professional in Early Childhood Education** (3) Staff  
Planning, reporting, maintaining records, teacher-child and teacher-family interaction, diagnosis and evaluations, working with paraprofessionals and parents. Emphasis on total classroom environment. (Spring)
- 234 **Professional Internship in Secondary Education** (3 to 6) Staff  
Supervised internship; required seminar. Admission by permission of instructor.
- 235 **Professional Internship in Elementary Education** (6 to 9) Beck, Paley  
Supervised internship; required seminar. Admission by permission of instructor. Prerequisite: TrEd 211 or equivalent. (Spring)
- 236 **Analysis of Teaching** (3) Staff  
Teaching viewed as a system; component aspects are examined with a view toward developing a critical method of analysis. Material fee, \$25. (Spring)
- 237 **Practicum in Early Childhood Education** (3 to 6) Staff  
Supervised professional activity in selected early childhood programs; seminar. Prerequisite: 12 credit hours in early childhood education and permission of instructor. (Fall and spring)
- 238 **Clinical Practicum in Reading** (3 to 6) Horrworth  
Supervised clinical experience, including observation and participation, in testing, tutoring, and teaching. Clients may include preschoolers through adults. Minimum of 120 clinic hours required. Admission by permission of instructor. Material fee, \$25.
- 241 **Education of the Gifted and Talented** (3) Staff  
Nature and discovery of giftedness, provision for the gifted in educational settings. Research findings and issues. (Summer)
- 245 **Secondary School Principles and Methods** (3) Staff  
Classroom management and teaching techniques for initiating, guiding, and evaluating learning activities. Group work to be arranged. Prerequisite: TrEd 206-7. Material fee, \$20. (Fall and spring)
- TrEd 246 through 251 offer theoretical, curricular, and practical considerations of teaching the content area concerned. Each course requires a 30-hour field experience in a secondary classroom. Prerequisite: TrEd 245 and 24 credit hours in the content area (math through calculus in the case of TrEd 250). Material fee, \$10 per course.
- 246 **Teaching English in Secondary Schools** (3) Mauro  
247 **Teaching Science in Secondary Schools** (3) Lynch  
248 **Teaching Social Studies in Secondary Schools** (3) Steeves  
249 **Teaching Art in Secondary Schools** (3) Staff

- 250 **Teaching Mathematics in Secondary Schools** (3) Hunter-Boykin
- 251 **Second Language Instruction** (3) Martinez
- 254 **The Middle School** (3) Staff  
Development, organization, and practices; emphasis on the learner, the teacher, the administrator, the curriculum, and the setting of the school for the pre-adolescent. (Fall)
- 273 **Pre-Service Teacher Education** (3) Staff  
Program development, governance, issues, trends. (Fall, alternate years)
- 274 **In-Service Planning and Programming** (3) Staff  
The continuing professional development of educators, with focus on the design, implementation, and evaluation of in-service training programs. Material fee, \$25. (Summer)
- 287-88 **Clinical Study and Treatment of Reading Problems** (3-3) Putnam  
Assessing and tutoring children and adults with reading problems. A case study approach is emphasized; participants are trained to use a wide range of diagnostic strategies, evaluate results, and plan and implement tutoring techniques. Prerequisite: TrEd 222 and 224. Material fee, \$25. (Academic year)
- 289 **Organization and Administration of Reading Programs** (3) Horrworth  
For school administrators and reading teachers. Problems in planning, organizing, and monitoring the total reading program. (Spring)
- 290 **Severe Learning Disabilities in Reading** (3) Horrworth  
The course links the fields of learning disabilities and reading, focusing on their interconnections in terms of etiology, characteristics, diagnosis, and remediation. (Fall)
- 291 **Reading and Writing Across the Curriculum** (3) Putnam  
A whole-language approach to structuring classroom curriculum: strategies for developing students' reading and writing skills while studying literature, social studies, mathematics, and science. (Fall and spring)
- 292 **Internship: Reading** (3 to 6) Horrworth  
Limited to graduate students in reading education. Experience in a selected area of teaching or supervisory service in field-based programs. Prerequisite: permission of instructor. (Fall and spring)
- 293 **Teaching Reading and Study Skills at the College Level** (3) Staff  
Evaluation of reading skills at the college level. Development of college reading programs, including diagnostic and teaching techniques, program planning and implementation. Prerequisite: TrEd 226 or equivalent, and permission of instructor. (Spring)
- 297-98 **Research and Independent Study** (1 to 3) Staff  
Individual research under the guidance of a staff member; program and conferences arranged with an instructor.
- 308 **Instructional Processes in Teacher Preparation and Special Education** (3) Ives  
Same as SpEd 308.
- 321 **Practicum in Curriculum and Instruction** (3 to 6) Staff  
Supervised field experience in curriculum. Admission by permission of instructor. Prerequisite: TrEd 205. (Fall and spring)
- 325 **Curriculum Theory** (3) Staff  
Examination of reviews and research studies on curriculum theory. Focus on trends, values, interpretations, design systems, and evaluation. Prerequisite: TrEd 205.
- 345 **Consultation Skills in Teacher Preparation and Special Education** (3) Ives, Shotel  
Same as SpEd 345.
- 354 **Doctoral Internship: Teacher Education** (6) Staff  
Same as SpEd 354.
- 370 **Interpersonal Dynamics in Teacher Preparation and Special Education** (3) Ives  
Same as SpEd 370.
- 378 **Post-Master's Internship in Curriculum and Instruction** (3 to 6) Staff  
Supervised fieldwork for selected experienced teachers. (Fall and spring)
- 390 **Doctoral Seminar in Curriculum and Instruction** (3) Shotel  
Review of literature in a topical area; preparation of a manuscript of publishable quality. Admission by permission of instructor. (Fall)



- 391 **Dissertation Research** (arr.)  
Prerequisite: TrEd 390.

Staff

**SPECIAL EDUCATION**

- 201 **Overview of Special Education** (3) Staff  
Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children with special needs in a school program. (Fall)
- 220 **Selected Topics** (arr.) Staff  
Topics and fees announced in the *Schedule of Classes*.
- 221 **Accessing Community Systems for the Special-Needs Individual** (3) Freund  
Overview of access to community systems and service delivery for individuals with special needs and their families. Material fee, \$25. (Summer)
- 222 **Legislative Issues in Supportive Training, Transition, and Education Programs** (3) Kochhar  
Examination, interpretation, and analysis of legislation and policies affecting the education and career development of individuals with disabilities. Emphasis on federal and state legislation in the context of national policy reform in disability services. Material fee, \$25. (Fall)
- 229 **Interpretation and Application of Academic and Vocational Assessment Information** (3) Staff  
Specific strategies and techniques to analyze, interpret, and synthesize assessment information for the development of comprehensive academic/vocational profiles for adolescents and adults with disabilities. Observation and recording procedures, report development, and postassessment conferencing are emphasized. Material fee, \$25. (Summer)
- 230 **Vocational Assessment of Individuals With Disabilities** (3 to 6) Ianacone  
Investigation of the vocational assessment process, including formal and informal systems to determine vocational interests, aptitudes, and employability. Material fee, \$25. (Spring)
- 231 **Transitional Special Education Programming** (3) Taymans  
Techniques and processes used in programming for the needs of individuals with disabilities as they prepare for transition to postsecondary programs and employment. Emphasis on the development of skills related to professional liaison and support roles in the design of instructional arrangements and cooperative training. Must be taken concurrently with SpEd 233. Material fee, \$20. (Fall)
- 232 **Dynamics of Career Intervention Techniques and Strategies for Individuals With Disabilities** (3) West  
Specific intervention techniques and strategies focusing on career and vocational decision making for individuals with disabilities. Emphasis on combining theoretical constructs with practical field experience. Material fee, \$25. (Fall)
- 233 **Curriculum in Transitional Special Education** (3) Taymans  
Theory and practice in planning, implementing, and evaluating curriculum for adolescents and adults with disabilities. Emphasis on techniques for modifying curriculum and materials for individualized programming. Requires field-site curriculum implementation. Usually taken concurrently with SpEd 231. (Fall)
- 234 **Seminar in Supportive Training, Transition, and Education Programs** (3) Kochhar  
Analysis and development of professional presentation and writing skills. Material fee, \$20. (Spring)
- 235 **Coordination of Job Placement Programs in Special Education** (3) Staff  
Rationale, resources, and programming strategies for the development and coordination of job placement programs for individuals with disabilities. Material fee, \$20.
- 236 **Introduction to Career/Vocational and Transitional Services** (3) West  
Introduction to programs that provide career, vocational, and transition services to adolescents and adults with disabilities. Material fee, \$25. (Spring and summer)

- 237 **Learning Strategies, Assessment, and Instruction for Learning Disabled Adolescents (3 to 6)** Taymans  
Theory and practice in the provision of effective and appropriate educational services to learning disabled adolescents. Material fee, \$25. (Spring)
- 240 **Developmental Process of Parenting (3)** Freund and Staff  
The developmental process of becoming a parent and ongoing parenting. Material fee, \$20. (Fall)
- 242 **Neurodevelopmental Programming for Handicapped Infants and Toddlers (3 or 6)** Brown  
Provides students with a theoretical background and practical experience to translate the neurodevelopmental model into techniques for developing and implementing educational programs for handicapped infants and toddlers. Prerequisite: SpEd 263 or 268 or permission of instructor. Material fee, \$30. (Spring and summer)
- 243 **Assessment of the Special-Needs Infant (3)** Freund  
Theory and current practice in the assessment of high-risk and handicapped infants. Material fee, \$30.
- 244 **Ethical Considerations in Neonatal and Infant Intervention (3)** Freund and Staff  
Overview of the major ethical issues involved in neonatal and infant intervention. The impact of recent and emerging technological innovations considered from medical, legal, ethical, and psychosocial perspectives. Material fee, \$25. (Spring and summer)
- 245 **Medical and Developmental Implications for Premature Infants and Their Families (3)** Freund, Brown  
Causes of prematurity and the implications of premature delivery on the infant and family. Specific medical conditions, treatment, long-term developmental implications, intervention, and planning. Material fee, \$25. (Spring)
- 250 **Specialized Techniques and Materials: Transitional Special Education (3)** Staff  
Specialized instructional techniques and resources in secondary, postsecondary, business, and community programming for individuals with disabilities. Emphasis on interagency and interdisciplinary planning and programming. Material fee, \$25. (Spring)
- 253 **Special Education in Corrections: State of the Art (3)** Staff  
An introduction to the delivery of special education services within the juvenile justice and corrections systems. Presentations by theorists and practicing professionals. Material fee, \$25. (Spring)
- 254 **Special Education in Corrections: Field Experiences (3)** Staff  
Site visits to local, state, and federal juvenile correction facilities and advocacy organizations, coordinated by a series of seminars integrating theory and practice. Emphasis on program structure, goals, and general service delivery for individuals with disabilities in correctional settings. Material fee, \$20. (Summer)
- 255 **Interdisciplinary Case Management for Special Populations (3)** Staff  
Examination of models for integrative academic, vocational, medical, and psychological service coordination and case management for special-needs populations. Emphasis on interdisciplinary team communication and coordination, decision making, planning, and follow-up for students and clients in secondary or adult settings. Material fee, \$25. (Spring)
- 256 **Curriculum-Based Methods for Individuals With Disabilities (3)** Staff  
Curriculum-based design, implementation, and modification for individuals with disabilities; methodology for individualized programming. Material fee, \$25. (Summer)
- 258 **Microcomputers in Special Education (3 to 6)** Castleberry  
Overview of current microcomputer technology. Assessment of computer-assisted instruction software as it relates to training, evaluation, and employment of handicapped individuals. Optional 3 credit hour practicum in a setting employing adaptive devices and microcomputers in the service of handicapped persons. Material fee, \$40. Prerequisite: Educ 180 or equivalent.



- 260 Developmental Assessment in Special Education (3)** Castleberry, Belknap  
Development of assessment skills with academic diagnostic instruments. Study of validity, reliability, nonbiased testing, aptitude, achievement, and appropriate approaches. Material fee, \$40. (Fall)
- 261 Practicum: Methods and Materials for Young Exceptional Children (3 or 6)** Staff  
Clinical practice in design and implementation of educational strategies and materials. Three dimensions: designing and developing teaching materials, classroom teaching, feedback and evaluation with professor. Requires eight hours a week on site. (Fall and summer)
- 262 Formal Assessment of Young Exceptional Children (3)** Castleberry  
Weekly seminar designed to prepare early childhood special educators to translate formal assessment data into instructional programming. Requires fieldwork with children. Material fee, \$25. (Fall)
- 263 Development of the Infant with Special Needs (3)** Brown  
The processes of normal infant development and interrelationships among areas of development; relationship of these processes to the growth and development of the at-risk child. Material fee, \$25. (Summer)
- 264 Educational Implications of Medical and Genetic Conditions of the Developmentally Delayed Child (3)** Freund  
Specialized programs, techniques, and methods for teaching developmentally delayed children, with emphasis on genetically linked handicapping conditions. Practitioner needs and programming concerns are stressed. Material fee, \$25. (Spring)
- 265 Clinical Experience With Multiply Handicapped and Developmentally Disabled Young Children (3)** Freund  
Field experience and accompanying seminar for students with limited experience in early childhood special education. Intensive involvement in an early childhood special education setting. (Summer)
- 266 The Development of Language in Exceptional Children (3)** Staff  
Introduction to the study of language acquisition and the development of language programs. (Fall)
- 268 Development of Young Exceptional Children: General Etiology of Handicapping Conditions (3)** Freund  
An in-depth examination of the development of young exceptional children and the specific nature of handicapping conditions. Lecture and field visits. Material fee, \$25. (Fall)
- 269 Etiology, Symptomatology, and Approaches to Intervention With Special-Needs Children (3)** Freund and Staff  
Typical and atypical development of special-needs children. Etiology and symptomatology of handicapping conditions. Extensive field observations. Material fee, \$25. (Spring)
- 270 Mainstreaming: Adapting Attitudes, Programs, and Curriculum for Special-Needs Students (3)** Belknap, Ives, Castleberry  
Meeting the needs of the special-needs student in the regular classroom. Material fee, \$20. (Spring and summer)
- 271 Interdisciplinary Approach to Planning for the Special-Needs Child (3 or 6)** Freund  
Interdisciplinary team functioning and case management using a systems approach.
- 273 Pre-Service Planning and Programming (3)** Staff  
Program development, governance, issues, trends. (Fall, alternate years)
- 274 In-Service Planning and Programming (3)** Staff  
The continuing professional development of educators, with focus on the design, implementation, and evaluation of in-service training programs. Material fee, \$25. (Summer)
- 275 The Limited-English-Proficient Special-Needs Child: Policy, Research, and Trends (3)** Mazur  
Issues regarding educational service delivery for the LEP special-needs child. National, state, and local policies; current research in bilingual education, special education, and bilingual special education. Appropriate assessment techniques, accessing community resources, and characteristics and needs of language-minority students and their families. Material fee, \$25.

- 276 **Academic and Psychosocial Assessment of the Limited-English-Proficient Special-Needs Child (3)** Mazur  
Issues and implications of second-language learning; the relationship between learning disabilities and problems related to adaptation to a different culture. Students review and evaluate formal and nonformal assessment measures and administer bilingual assessment materials.
- 277 **Teaching the Limited-English-Proficient Student: Methods and Materials (3)** Mazur  
Commonly used tests, formal and informal assessment strategies and prereferral interventions, and curricular and classroom management strategies for use with bilingual students who are handicapped or have special needs. Instructional adaptations designed to meet cultural, linguistic, and academic needs in both mainstream and special classes. Material fee, \$25.
- 278 **Internship: Educational Intervention for the Limited-English-Proficient Special-Needs Child (3 to 6)** Mazur  
Supervised internship. Students learn to write culturally relevant IEP programs, conduct effective parent interviews, and relate assessment findings to productive programming.
- 280 **Developmental Assessment of Adolescents (3)** Staff  
Formal and informal psychoeducational assessment; assessment instruments commonly used with upper-elementary and junior and senior high school students; the writing of psychoeducational reports. Material fee, \$25. (Spring)
- 285 **Facilitating Essential Systems for the Seriously Emotionally Disturbed Student (3)** Ives  
The various systems (home, school, interagency, community) that have an effect on the life of a seriously emotionally disturbed student. Skills necessary to help enable these systems to function in the service of seriously emotionally disturbed students. Material fee, \$25.
- 287 **Interdisciplinary Topics Related to the Seriously Emotionally Disturbed Student (3)** Belknap, Ives  
Topics may include aspects of psychopharmacology, abuse, suicide, and the addictive process. Recent research and treatment advances. Material fee, \$25. (Summer)
- 288 **Characteristics of the Seriously Emotionally Disturbed Student: Infancy Through Adolescence (3)** Belknap  
An in-depth examination of psychiatric diagnostic categories, psychosocial development issues, and the nature and needs of the seriously disturbed student. Material fee, \$25. (Fall)
- 289 **Curriculum and Instructional Strategies for the Seriously Emotionally Disturbed Student (3 to 6)** Ives  
Design, adaptation, and implementation of instructional methods and materials. Material fee, \$25. (Fall)
- 290 **Affective Development and Behavior Management in Special Education (3)** Castleberry, Freund, Belknap  
Theory, programming, and behavior management strategies from theoretical and practical points of view. Material fee, \$25. (Spring)
- 291 **Behavior Management Practicum: The Seriously Emotionally Disturbed Student (3)** Ives  
Field-based examination of theory of and techniques for classroom control. Causes of behavior. Material fee, \$25. (Summer)
- 292 **Professional Internship in the Education of Young Exceptional Children (3 or 6)** Castleberry  
Supervised internship in the education of young exceptional children. A minimum of 420 clock hours required. (Spring and summer)
- 293 **Professional Internship for the Special Educator (3 or 6)** Freund, Castleberry  
Supervised internship in early intervention. Material fee, \$25. (Spring and summer)
- 294 **Professional Internship: Service to the Seriously Emotionally Disturbed Student (6 to 9)** Ives, Belknap  
Full-time placement as a psychoeducator in various sites. (Spring)



- 295 **Professional Internship in Supportive Training, Transition, and Education Programs (1 to 9)** Kochhar  
Supervised internship focused on providing career/vocational and transition support services for individuals with disabilities in secondary, post secondary, and employment settings. Emphasis on interdisciplinary and interagency coordination; 140-420 clock hours required. (Fall, spring, and summer)
- 296 **Philosophical, Legal, and Practical Issues of Service Delivery for the Special-Needs Child (3)** Shotel  
Historical and legal perspectives that have had an effect on service delivery systems for the special-needs child. Consequences of legislation on systems of service delivery in the public school. The impact on the regular classroom teacher and the administrator. Material fee, \$25. (Summer)
- 297-98 **Research and Independent Study (1 to 3)** Staff  
Individual study or research under guidance of staff member. Admission by permission of advisor. May be repeated for credit.
- 301 **Research Seminar in Special Education (arr.)** Staff  
Participation in a small group with a selected faculty member; research on and discussion of an area of common interest. Admission by permission of instructor. (Spring)
- 303 **Administration and Supervision of Special Education (3)** West  
Philosophy and nature of special education; program organization, administration, and development. Surveying local needs; program evaluation and supervision. Admission by permission of instructor. Material fee, \$25. (Summer)
- 304 **Recent Research and Trends in Special Education (3)** Taymans  
Emphasis on topical research issues, problems of conducting research, and procedures and sources for obtaining research funding. Material fee, \$25. (Fall and spring)
- 306 **Dynamics of Family Intervention: Theory and Practice in Special Education (3)** Ives, Freund  
Theoretical foundations and clinical techniques necessary for the special educator to counsel parents of handicapped students. Material fee, \$25. (Spring)
- 308 **Instructional Processes in Teacher Preparation and Special Education (3)** Ives  
Philosophical and methodological aspects of staff development and university programs; opportunities for practice in needs assessment, program design, and instruction. Admission by permission of instructor. Material fee, \$20. (Spring)
- 343 **Psychoeducational Diagnosis in Special Education (3)** Belknap  
The range of diagnostic strategies applicable to the student who presents psychosocial and related learning difficulties. Admission by permission of instructor. Material fee, \$25. (Spring)
- 345 **Consultation Skills in Teacher Preparation and Special Education (3)** Ives, Shotel  
Consultation models from organizational development, organizational psychology, and mental health applied to in-service training for educational personnel and programs for the special student in the public schools. Material fee, \$25. (Spring and summer)
- 351 **Developing Home/School/Community Support Systems (3)** Belknap, Ives  
Provides experiences that facilitate effective home/school/community support for the emotionally disturbed adolescent. Review of literature on dysfunctional family systems. (Spring)
- 352 **Seminar: Legal Issues and Public Policy Concerns for Individuals Who Are Handicapped (3)** Kochhar  
Overview of current legislation and public policy affecting education, employment, and civil rights of individuals with disabilities. The emergence of disability policies; policy directions in the context of current and future educational reforms. Material fee, \$25. (Summer)
- 353 **Post-Master's Internship in Special Education (3 to 6)** Staff  
Supervised professional internship in college teaching, administration, supervision, research, or policy-making. Internships are individually arranged. Admission by permission of instructor. (Fall and spring)

- 354 Doctoral Internship: Special Education (3 to 6)** Staff  
Supervised professional internship in college teaching, administration, supervision, research, policy-making, or private agency function. Each internship is individually arranged. Admission by permission of advisor. (Fall and spring)
- 360 Interdisciplinary Techniques in the Diagnostic Process in Special Education (3)** Staff  
Application of theoretical concepts of assessment; development of assessment programs; interpretation and application of interdisciplinary diagnostic evaluations. Prerequisite: SpEd 260 or equivalent, and permission of instructor. Material fee, \$25. (Fall)
- 370 Interpersonal Dynamics in Teacher Preparation and Special Education (3)** Ives  
Attitude change and the access process. Applies specific psychosocial constructs germane to successful interaction to the milieu of the consultant/administrator. Material fee, \$25. (Fall)
- 390 Doctoral Seminar in Special Education (3)** Shotel  
Review of literature in a topical area; preparation of a manuscript of publishable quality. Admission by permission of instructor. (Fall)
- 391 Dissertation Research (arr.)** Staff  
Prerequisite: SpEd 390.

## TELECOMMUNICATION

Professors C.H. Sterling (Director), G. Brock  
 Professorial Lecturers J.C. Baker, R.M. Finn, R.J. Oslund, L. Darby  
 Associate Professorial Lecturers R.S. Belous, J.C. Reed

Columbian College and Graduate School of Arts and Sciences, in cooperation with the School of Engineering and Applied Science, offers a multidisciplinary program leading to the degree of Master of Arts in the field of telecommunication. The program focuses on the interaction among technology, economics, management, and both corporate and governmental policy-making in the common carrier and media industries.

*Master of Arts in the field of telecommunication*—Prerequisite: a bachelor's degree with a B average from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, including at least 36 credit hours of course work. Required courses for the degree include Econ 217 and 249; EE 450 and 451; TCom 201, 230, 231, 240, 241, 259; and two electives selected with a faculty advisor, typically chosen from TCom 220, 224, 235; EE 452; and Mgt 282. Each student must pass a Master's Comprehensive Examination. A thesis option is available.

Telecommunications management is available as an elective field for the Master of Public Administration program in the School of Business and Public Management; telecommunications and computers is available as an area of concentration within the Master of Science program in the School of Engineering and Applied Science.

- 201 Development of the Telecommunication Industry (3)**  
Development of telecommunication technology, industry, and policy in the United States, stressing interrelationships among industry, government bodies and policies, and users.
- 220 Technology and Telecommunication Policy (3)**  
National and international policy issues that arise from the interaction between scientific and technological development in the telecommunication industry and government policies. Prerequisite: TCom 201.
- 224 Telecommunication Regulation (3)**  
Background, current status, and trends in regulation of common carriers and electronic media. Legislative, FCC, and judicial decisions and trends. Emphasis on the process of federal regulation, with case studies. Prerequisite: TCom 201.
- 230 Principles of Telecommunication Management (3)**  
Fundamentals of daily telecommunication operations, including human factors in organizations, acquisition and procurement, research and development, logistical planning, and relations with carriers and manufacturers.



- 231 Telecommunication Management and Marketing (3)**  
Strategic planning in regulated and competitive telecommunication industries; managing and marketing a technology-based business; different management and marketing approaches and their strengths and weaknesses; legal constraints; responsibilities and ethics. Prerequisite: TCom 230.
- 235 Telecommunication Finance (3)**  
Principles and methods of asset valuation; measurement and interpretation of financial flows; financial statements; risk assessment; capital markets; capital budgeting; effects of economic regulation on capital formation. Prerequisite: Econ 217 or permission of instructor.
- 240 Seminar in Domestic Telecommunication Policy (3)**  
Interaction of private and public policy in telecommunication: research and development, market entry, competition, ownership and acquisition, regulation, business decisions, and social impact. The course is intended for degree candidates in their final year of study in the telecommunication program.
- 241 Seminar in International Telecommunication Policy (3)**  
Role and process of U.S. and international telecommunication organizations; system authorization and utilization, transborder data flow and New World Information Order, barriers to trade in information equipment and services, regional facilities planning process, and development of competition. For degree candidates in their final year of study in the telecommunication program.
- 259 Applications of Economics in Telecommunication (3)**  
Structure, interrelationship, and function of the telecommunication industry within a changing regulatory framework. Prerequisite: Econ 249.
- 297 Special Topics (3)**  
Special topics in technology, economics, operations, or policy. May be repeated for credit once provided the topic differs. Prerequisite: TCom 201 and permission of instructor.
- 298 Independent Study (1 to 3)**  
Prerequisite: permission of instructor.
- 299-300 Thesis Research (3-3)**

## THEATRE AND DANCE

Professor M.R. Withers

Associate Professors N.D. Johnson (Chair), W.A. Pucilowsky

Assistant Professors B.W. Sabelli, C.F. Gudenius

*Master of Fine Arts in the field of theatre*—Prerequisite: the degree of Bachelor of Arts from this University, or an equivalent degree.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences.

For the concentration in theatre design, the program of study consists of 54 credit hours of 100- and 200-level course work in theatre and dance and in art, planned in consultation with the advisor, including a creative thesis (TrDa 299-300). The program may be planned to emphasize scenery, lighting, costume, or museum exhibit design; in the case of an emphasis on museum exhibit design, the program of study will include courses from the Museum Studies Program.

For the concentration in dance, the program of study consists of 36 credit hours of 100- and 200-level course work in theatre and dance and in related arts, planned in consultation with the advisor, including a creative thesis (TrDa 299-300).

For listings of 100-level courses, see the Undergraduate Programs Bulletin.

Prerequisite to all third-group courses: M.F.A. candidacy or permission of instructor.

- 203 Professional Literature (3)** Johnson  
Survey of the literature of dance, including print and media materials.
- 207 Trends in Contemporary Performance (3)** Withers  
Study and discussion of current work in performance. Guest lectures and field study. Emphasis on individual projects.
- 231 Lighting Design (3)** Gudenius  
Theory and execution of lighting design for theatre and dance. Prerequisite: TrDa 131. May be repeated for credit. (Spring)

- 233 **Architecture of Theatre and Exhibit Spaces (3)** Sabelli  
Theatrical architecture from a historical perspective. Traditional and nontraditional exhibit, theatrical, and assembly spaces are examined and evaluated with reference to the functional use of space from practical, architectural, and aesthetic perspectives. Studio work includes design of a hypothetical performance space and its auxiliary units.
- 234 **Scene Design: Renderings (3)** Sabelli  
Preparation for the advanced student designer, with emphasis on the individual development of rendering techniques, technical drafting, traditional script analysis, and original scenographic interpretations. May be repeated once for credit. (Fall, even years)
- 235 **Scene Design: Model Making (3)** Sabelli  
Exploration of all styles of traditional and contemporary scenography through the making of scale models. May be repeated once for credit. Admission by permission of instructor. (Spring)
- 236 **Intermediate Costume (3)** Pucilowsky  
Introduction to the basic techniques of costume design through specific projects. Various rendering techniques will be explored, consistent with the historical period concerned. May be repeated for credit. Prerequisite: TrDa 136. (Spring, odd years)
- 237 **Advanced Costume (3)** Pucilowsky  
Study of special design, style, and construction problems. May be repeated for credit.
- 238 **Pattern Making (3)** Pucilowsky  
The study of pattern drafting and draping methods, based on contemporary and historical clothing, through lecture and class work. Prerequisite: TrDa 136. (Spring, even years)
- 250 **Advanced Dance Technique (2)** Staff  
Advanced study in selected styles: ballet, modern, Spanish. May be repeated for credit.
- 252 **Advanced Dance Composition (3)** Withers  
Elements of dance composition explored through improvisation, short movement studies, and dances that are presented, discussed, and reworked. May be repeated for credit.
- 255 **Choreographic Projects (1 to 3)** Withers  
Original dances are created or dances are reconstructed for performance under the guidance of dance faculty. May be repeated for credit.
- 260 **Special Studies in Dance Video (3)** Withers  
Review of existing art works of dance video and dance film for content and television production techniques. Emphasis on projects in-studio and with VHS and professional equipment. Lecture and laboratory.
- 270 **Aesthetics and Criticism (3)** Johnson  
Examination of aesthetic theories of dance as a performing art, with application to criticism.
- 290 **Workshop (1 to 3)** Staff  
Workshops with emphasis on contemporary issues and problems. Development of advanced professional competencies. Experts in short intensive periods. May be repeated for credit.
- 291 **Internship (3 or 6)** Staff  
Internships with dance and theatre companies or arts organizations, including conference and/or seminar. May be taken for a total of 6 credit hours.
- 292 **Selected Topics (1 to 3)** Staff  
May be repeated for credit.
- 294 **Independent Research in Theatre and Dance (arr.)** Staff  
May be repeated for credit.
- 299-300 **Thesis Research (3-3)** Staff

## TOURISM STUDIES

See Exercise Science and Tourism Studies.



## UNIVERSITY PROFESSORS

University Professors A. Etzioni, P.J. Caws, S.H. Nasr, K.F. Schaffner, J.N. Rosenau

Courses numbered in the 770s are taught by distinguished scholars who hold appointments as University Professors. With the approval of the department or program concerned, appropriate University Professor courses may be taken to satisfy degree program requirements. Permission of the University Professor may be required for enrollment. A complete listing of courses offered each semester appears in the *Schedule of Classes* under the 700 series. Following is a list of courses that are expected to be taught fairly regularly by University Professors.

IAff/PSc

770 **Turbulence in World Politics** (3)

Rosenau

An effort to probe the sources and dynamics of change and continuity in local, national, and international affairs. The links between the orientations of individuals and the actions of collectivities are a major focus, along with the foundations of authority under transformative conditions. For graduate students; open to upper-level graduates.

IAff/PSc

771 **Political Aggregation** (3)

Rosenau

An exploration of how collective action is fashioned out of the input of individuals, how collectivities become larger than the sum of their parts, and how political organizations manage to persist through time. Socialization, mobilization, momentum, and bandwagon effects are among the concepts evaluated. For graduate students; open to upper-level undergraduates.

HmSc

771 **The Cinema of Morals/The Morals of Cinema** (3)

Caws

Vicarious moral experience in the cinema; examples of such experience in film and the moral arguments they provoke; the power of cinema as a shaper of moral sentiment; moral issues in the production and distribution of films. For graduate students; open to undergraduates.

Phil

772 **Individualism** (3)

Caws

The concept of the free individual in philosophy, psychology, literature, and politics; individuals and groups; individualism and collectivism; exemplary individuals in biography, autobiography, and fiction; problems of individual and collective agency and identity. For undergraduates; open to graduate students.

Phil

774 **Understanding Technology** (3)

Caws

The idea of technology—its relation to the sciences and the arts and humanities, its development, and its problems. Technology will not be regarded as merely dependent on the sciences or as merely useful (or dangerous) but as a human activity in its own right, with its own history, conceptual structure, interests, risks, and benefits. For undergraduates; open to graduate students.

Phil

778 **Left and Right in Philosophy and Politics** (3)

Caws

A fundamental inquiry into the concept of the state in terms of entrenched oppositions: individualism/collectivism, equality/liberty, liberalism/conservatism, socialism/free enterprise, communism/capitalism. Emphasis on the present need to find a constructive transcendence of these oppositions. For undergraduates; open to graduate students.

Phil

779 **Philosophy and Psychoanalysis** (3)

Caws

An exploration of some striking parallels between the topics addressed by Freud's psychoanalytic theories on the one hand and the traditional content of philosophical reflection on the other, with special emphasis on the relation between cognitive theory and therapeutic practice (in both disciplines). For undergraduates; open to graduate students.

HCS/Phil

770 **Philosophy of Medicine** (3)

Schaffner

An introduction to philosophical issues in medicine, including the nature of the doctor-patient relationship, whether diseases are objective or socially condi-

tioned entities, clinical reasoning using some simple examples from medical diagnosis and new drug testing, and ethical and social issues raised by the AIDS epidemic. For undergraduates; open to graduate students.

Phil

**771 Philosophy of Biology (3)**

Schaffner

An introduction to philosophical issues in biology, including evolutionary biology (Darwinian, neo-Darwinian, and creationist views), molecular biology and reductionism, teleology, philosophical implications of the neurosciences, sociobiology, and evolutionary ethics. For undergraduates; open to graduate students.

HCS/Phil

**773 Introduction to the Medical Humanities (3)**

Schaffner

Practical ways in which the humanities can assist problem solving in medicine and health care. Philosophical theories of medicine and health care, the role of literature in modeling ethical deliberation, and the roles of religious and humanistic values in a secular decision-making environment. For undergraduates and medical students; open to graduate students.

HCS/Phil

**775 Ethics and Health Policy (3)**

Schaffner

The problem of health care reform, including the question of a "right" to health care (and to long-term care), alternative models of health care delivery; and the issue of health care rationing, focusing on the Oregon proposals. Issues relating to the "right to die," including active and passive euthanasia and doctor-assisted suicide. For graduate students; open to undergraduates.

HCS/Phil

**777 The Human Genome Project: Ethical, Legal, and Social Implications (3)**

Schaffner

Ethical, legal, and social implications of the plan to sequence the entire human genome by the year 2005, including confidentiality of genetic information, genetic discrimination and insurance, reductionistic and deterministic implications of the project, the role of public opinion, and research priorities in health care. For graduates and medical students; open to undergraduates.

Rel

**770 Islamic Civilization and the West (3)**

Nasr

The encounter of Islam and the West, from the rise of Islam to modern times. Investigation of the impact of Islam on European philosophy, science, art, and literature; influence of the West and Western scholarship on the Islamic world. For juniors and seniors; open to graduate students.

Rel

**771 Persian Sufi Literature in East and West (3)**

Nasr

The writings of major Persian Sufi poets and writers, such as Khayyam, Attar, Rumi, Shabistari, and Hafiz, and their impact on the West and on India. The translation of these works into European languages and their influence upon such figures as Goethe and Emerson are discussed. Assigned readings in English. For undergraduates; open to graduate students.

Rel

**772 Mysticism—East and West (3)**

Nasr

A thematic examination of major elements and components of mystical traditions, dealing with such issues as the nature of mysticism, the search for ultimate reality, the mystical significance of the cosmos, the mystical science of the soul, and the significance of sacred art and symbols. Major mystical traditions of East and West—Hinduism, Taoism, Buddhism, Judaism, Christianity, Islam.

Rel

**773 Perennial Philosophy (3)**

Nasr

The idea of perennial philosophy as developed in the 20th century by A. Huxley, A.C. Coomaraswamy, and others. Doctrines and teachings of perennial philosophy as found in various religious and philosophical traditions of East and West. Prerequisite: at least one course in religion, philosophy, or intellectual history. For undergraduates; open to graduate students.



Rel

**775 Man and the Natural Environment (3)**

Nasr

The religious, philosophical, and scientific causes of the present environmental crisis. The history of religious and philosophical attitudes toward nature in the West, the history of Western science, and some non-Western world views that may encourage a more harmonious relationship between man and the natural environment.

Rel

**777 Religion and Science (3)**

Nasr

The interaction between religion and science in ancient Egypt, classical Greece, Islam, India, China, and the West, from the Renaissance, the scientific revolution, and up to the present day. Key concepts and issues in the encounter of religion and science in light of the cultural matrix of the civilization and period in question. For juniors and seniors; open to graduate students.

Soc

**776 Public Policy Research (3)**

Etzioni

Basic concepts of policy research in comparison to basic and applied research. Policy research methods. The social structure of policy research: producers and consumers of knowledge and issues arising among them. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: social science or public policy course work or related experience.

Soc/Econ/PSc

**779 The Elements of Socioeconomics (3)**

Etzioni

A synthesized approach to the study of economic behavior and economic policy, drawing on relevant segments of economics and sociology as well as political science and psychology. A discussion of ethical assumptions and core concepts in the study of micro- and macroeconomic behavior and their policy implications. For graduate students; open to qualified undergraduates.

**VIRGINIA CAMPUS**

With an emphasis on graduate education and research, The George Washington University Virginia Campus began its first academic programs in August 1991. The School of Engineering and Applied Science, School of Business and Public Management, Columbian College and Graduate School of Arts and Sciences, and School of Education and Human Development offer graduate study leading to master's and doctoral degrees at this site. The Virginia Campus offers extensive library and research facilities networked by computer to information databases nationwide.

The School of Engineering and Applied Science offers several master's and doctoral degree programs through its four departments—Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Engineering Management; and Operations Research. Three "executive" programs are offered in a nontraditional weekend format for professionals who wish to pursue advanced degrees without career interruption: the Executive Master of Science in Administrative Sciences with a concentration in information systems, offered by Columbian College and Graduate School of Arts and Sciences; the Executive Master of Business Administration, offered by the School of Business and Public Management; and Executive Leadership in Human Resource Development leading to the Doctor of Education, offered by the School of Education and Human Development. The Virginia Campus also offers a comprehensive program of noncredit courses through the Division of Continuing Education.

Academic programs on the Virginia Campus are extensive and growing. Please note that programs listed here include only those that are exclusive to the Virginia Campus. Programs offered at this and other sites are listed by academic department. Contact the Virginia Campus Marketing Office for complete information on programs at this site.

**ADMINISTRATIVE SCIENCES**

*Executive Master of Science in the field of information systems*—A unique, weekend-oriented program for high-potential, mid-level managers and senior executives, offered by Columbian College and Graduate School of Arts and Sciences. The 36-credit-hour multidisciplinary curriculum focuses on the role of information systems and behavioral and decision sciences in problem solving and decision making. The program is designed to

meet the needs of individuals from a variety of professional and educational backgrounds. Applicants generally are expected to have a minimum of ten years of professional experience and a bachelor's degree with a *B* or better average from an accredited college or university. Program participants represent a broad range of public and private sector organizations; they hold positions that include president, senior marketing specialist, division director, senior engineer, program manager, and consultant.

The program enrolls two student cohorts per year, in September and January, with each cohort undertaking a fixed sequence of courses during the 15-month accelerated program. Classes meet every other weekend, providing an alternative educational opportunity for professionals unable to pursue a traditional graduate program. The faculty consists of a core of full-time professors, augmented by recognized leaders in particular disciplines and distinguished guest lecturers from government and industry.

The curriculum includes four core courses—AdSc 209, Econ 219, Psyc 259, and OR 231; four information technology courses—AdSc 207, 230, 231, and 239; and four decision sciences courses—AdSc 235, 236, 237, and 238.

The administrative sciences courses listed below are offered at the Virginia Campus only and are available to Executive Master's students only; other courses required for the degree are listed elsewhere in this Bulletin, under the department or program concerned.

**210 Information Engineering and CASE Tools (3)**

The design of information systems as evolved via information engineering principles and computer-assisted software engineering tools. Data attributes, data modeling, and object-oriented programming.

**230 Information Systems I (3)**

An overview of management information systems; integration of management, information, and systems concepts into a unified framework. Fundamental concepts of operating systems, data communications, and database management systems.

**231 Information Systems II (3)**

Distributed data processing techniques and local area network design, including forms of communication, transmission media, and communication software. Computer fraud and security countermeasures. The social and legal environment of information systems. Antitrust and other implications of transborder data flow, technology transfer, and protection of property rights in software.

**235 Decision Support and Expert Systems (3)**

Computer-based decision-making aids and simulations. Issues in effective implementation of decision support systems. Review and analysis of various expert systems, including tools and generators, classification vs. diagnostic type systems, and building modules. Design of decision support and expert systems.

**236 Seminar in Decision Sciences (3)**

Algorithmic and software aspects of information systems design; individual and group decision making processes and techniques. Use of the Management Decision Center in idea generation, evaluation, ranking, and group convergence and decision making.

**237 Strategic Planning and Executive Information Systems (3)**

Developing an organizational strategy, implementation of a long-range plan, and the role of mergers and acquisitions. Technology assessment and technical management, use of critical success factors, and the design and use of executive information systems in strategic management.

**238 Group Decision Support Systems Seminar (3)**

Group networking in a variety of settings in the Management Decision Center to resolve issues and develop action plans. Assessment of the impact of decisions upon organizational and individual behavior; concepts of ownership, group participation and consensus, group dynamics, and leadership style.

**239 Management and Security of Information Systems (3)**

Principles of information resource management; end-user development of information systems; information system security; policy issues, including data privacy, property rights in software, and transborder data flow.

## EXECUTIVE MASTER OF BUSINESS ADMINISTRATION

The Executive Master of Business Administration is an intensive program for recognized leaders to enhance competitiveness in business. The program draws students from communications, finance, real estate, biotechnology, and other high-tech industries as well as



the public sector. Open to mid- and senior-level managers with at least ten years of professional experience, this unique program offers a fast-paced, integrated curriculum specially designed to encourage an environment of lively exchange between participants and the faculty. The curriculum involves courses developed from all major disciplines of the School of Business and Public Management, including marketing, finance, operations, management science, information systems management, and international business. The program focuses on the growing roles in business and society of global markets, emerging technologies, and the changing work force. Meeting one day per week on alternating Fridays and Saturdays, the Executive MBA allows participants to continue their careers while they study and master a broad range of skills. Classes of approximately 35 students operate as a cohort, with all courses given in lock-step fashion over a 21-month period, comprising four academic semesters. The 60-credit-hour program is offered only at the Virginia Campus and includes four one-week residencies, one of them abroad.

The courses listed below are available only to degree candidates in the Executive Master of Business Administration program.

- 202 Organization, Management, and Leadership (3)** Vaill  
Integrates organizational concepts with management principles and theory applied to public and private organizations. Management thought, functions, and practices. Current management approaches and future challenges. Theories of managerial leadership, leadership issues, and problems in organizations at higher levels.
- 210 Managerial Economics (3)** Beales  
Intermediate-level micro- and macroeconomic theory and its application in public and private-sector decision making. Demand, production, costs, investments, market structure and strategy, and market outcomes. Interpretation of economic conditions and theory and practice of monetary and fiscal policy.
- 212 Business and Public Policy (3)** Lenn  
The political, legal, economic, social, and ethical forces that act on business. Interaction of the market system and public policy process in the development of law and regulation, along with the evolving relationship of business and government in American society.
- 214 Fundamentals of Decision Science and Computational Methods (3)** Forman  
Theory and methods of business decision making, including intelligence design, and choice. Useful approaches in cases of multiple objectives, compensatory and noncompensatory decision approaches, uncertainty and statistics, analytical models, and quantitative and qualitative measurement skills.
- 216 Marketing Management (3)** Dyer  
The marketing process from the firm's viewpoint. Market analysis, product planning, channels of distribution, pricing, and promotion. Approaches to financial, operational, and international market considerations. The impact of environmental and other business forces on marketing practice.
- 220 Managing of Operations in Production and Service Firms (3)** Bagchi  
Fundamentals of production and operations management and the associated tools and techniques used in decision making. Resource allocation, inventory management, and production planning and control. Technology-related developments, such as flexible manufacturing systems and computer integrated manufacturing.
- 222 Financial Accounting (3)** Sheldon  
The role of accounting in the decision-making process of management and external parties. Interpretation of financial statements for the guidance of management. Interpretation and implementation of financial accounting.
- 224 Theory and Concepts of Finance (3)** Handorf  
Long-term financing and current operations, investment decisions, and dividend policy. Financial analysis, business theory, and policy and practice in financial management. The role of capital formation and the relationship of public policy and the structuring of interest rates.
- 226 The Changing World Community: Implications for the Global Economy (3)** Lauter  
The global competitive framework and how nations develop and sustain competitive advantages. The role of the multinational firm. The 1992 European Community integration plan, the economic transformation of the Eastern European

nations, and the internationalization of the Japanese economy with reference to the United States.

- 230 Competitiveness and Corporate Innovation (3)** Donnelly  
Business, technological, economic, and political factors influencing the development of new products. Competitiveness and joint ventures, both locally and globally, involving technological innovation and transfer. Enhancing organizational innovation, product concept development, technology marketing, and corporate venture divisions.
- 240 International Business Strategy and Practice (3)** Ghadar  
The changing international environment and its impact on domestic and foreign multinational corporations. International finance, marketing, strategy, negotiations, and product policies. The economic, cultural, and political aspects that influence market conditions.
- 250 Financial Decision Making in Firms and Markets (3)** Cohen  
Decisions made by financial managers about working capital, fixed assets, and sources of financing in the context of world-wide business operations. Examines securities markets from the dual viewpoints of the company as a user of capital and investors as suppliers of capital. The relationship of risk and return and the value of securities.
- 252 Power, Politics, and Ethics (3)** Chitwood  
Ethical judgments of corporate professionals, managers, and public officials. Problems and alternatives for private and public institutional arrangements to meet the needs of society. Concepts and strategies of ethical analysis are applied to specific problems, such as risk management, plant relocation, and preferential hiring.
- 254 Managerial Accounting (3)** Baber  
The role of accounting in the management decision-making process. Costing systems, cost behavior analysis, responsibility accounting, and volume-profit relationships. Budgeting for financial planning and control; pricing and product mix decisions.
- 256 Organizational Behavior and Human Resource Management (3)** Winslow, Malone  
Interpersonal and group dynamics in various organizational settings; direct managerial intervention in the process of organizational development. Issues and opportunities in managing outside one's own culture; executive selection and development; current personnel management practices and procedures.
- 260 Strategy in Manufacturing and Operations (3)** Perry  
Strategy formulation and implementation in manufacturing and operations. Integrated manufacturing networks, capacity and facility planning, process technology, product design and introduction, material sourcing and positioning, total quality management, and implementing strategic change in manufacturing.
- 262 Information Systems in Management (3)** Coyne  
A management-oriented survey of current and developing information technologies, including hardware, software, and systems development. The impact on management of the computing milieu. Information systems requirements and multimedia database approaches to handling data for business decision making.
- 263 Executive Decision Support (2)** Soyer  
Theory and methods of decision making in business and organizational situations. Judgmental forecasting, including statistical modeling, forward/backward planning process, conflict resolution, quality management, and value assessment. Use of computational tools, including spreadsheets, in forecasting.
- 265 Marketing Strategy (2)** Divita  
Complex marketing problems involving policy and operational decisions. Marketing strategies in the perspective of environmental forces and business functions. The marketing research process. Marketing of intangibles and new and existing services, including service product decisions and planning.
- 267 Entrepreneurship and Creation of New Ventures (2)** Staff  
The process of innovation and entrepreneurship in the creation of new ventures. Access to venture capital; tax considerations; marketing new products and services. Approaches to managing small ventures, including technology-based ventures, and management for venture innovation in large and small organizations.



- 268 Managing Change in Projects (2)** Frame, Wells  
Managerial needs, requirements, and resource allocation decisions. Managing under conditions of change in situations of complexity and interdependence. Surveys projects from the emerging information age to more traditional product and system areas. Projects in research and development, marketing, finance, real estate, construction, and international development.
- 269 Business History and Trends (2)** Becker  
Interprets the postindustrial era history of business institutions in manufacturing, distribution, transportation, and finance. Market, economic, governmental, and social contexts as well as impacts of developments in automation, energy, medicine, bioengineering, information technology, and space.
- 270 Strategy Formulation and Implementation (3)** Cook, Halal  
Approaches to formulating strategies that enable organizations to adapt to changing social, technological, economic, and political conditions. Strategic management from the general manager's perspective; evaluation and control of strategy in various types of organizations.

### EXECUTIVE LEADERSHIP IN HUMAN RESOURCE DEVELOPMENT

*Doctor of Education in the field of human resource development*—Prerequisite: A master's degree from an accredited college or university, three years of full-time experience in human resource development, and the general requirements for admission to Ed.D. degree candidacy stated under the School of Education and Human Development.

The program provides a forum through which doctoral Fellows, their organizations, and the University can build leadership in human resource development and bring about significant change within cooperating organizations. Fellows move through the program in a cohort group. Each cohort is a deliberate mixture of professionals from diverse industries as well as government and from a variety of geographic locations across the United States.

The program focuses on six themes that correspond to semesters, followed by work toward the dissertation. Class sessions are held one weekend a month (Friday and Saturday) for a period of two and a half years. A week-long session begins the program and an additional two-week session takes place each subsequent year. The specific time period for completing the dissertation varies.

*Leadership*—Fellows gain an understanding of pivotal theories of leadership and apply these theories to their own organizations. Empowerment, team development, integrity, and systems thinking are explored. There is an emphasis on the personal leadership development of the Fellows within the program.

*The Learning Organization*—Fellows focus on learning at both the individual and system level. Learning theory, critical thinking, and organizational learning are explored. Fellows engage in action learning projects that address a problem within their own organizations.

*Research*—Fellows survey the depth and breadth of current research in human resource development, focusing on areas of particular interest to themselves and their organizations and developing research skills in both quantitative and qualitative methods.

*The Changing Environment*—Fellows address current change theory and understanding and implementing of change in an organizational setting. Forces influencing change, such as diversity and globalization, are examined.

*Integration and Application of Central Concepts*—Fellows seek to integrate the knowledge they have gained in the program by applying it to a project within their own or an exchange organization. This process serves both to provide a real-world application of their knowledge and an opportunity to expand it.

*Specialization; Developing In-Depth Knowledge*—Fellows focus on one or two specific areas of study relevant to their organizations, themselves, and the field. Examples of topic areas are the impact of technology, autonomous work teams, retraining the work force, or the implementation of total quality management.

Fellows are required to research, write, and defend a dissertation. This research effort is an opportunity for each Fellow to make a significant contribution to the field of human resource development. The student continues to register for Dissertation Research (HRD 391) until the final oral examination has been successfully completed.

## WOMEN'S STUDIES

Associate Professors P.M. Palmer, S. Quitslund (Director)  
 Associate Professorial Lecturers C.A. Douglas, M. Zavos  
 Adjunct Assistant Professor C. Deitch

**Committee on Women's Studies**

L. Brandt, C. Burack, M.M. Cassidy, C. Deitch, S. Lynch, E. Marder, P.M. Palmer, A. Rominos, G. Savage, T. Wallace, P. Wathen, G. Weiss, B. Wolfman

Columbian College and Graduate School of Arts and Sciences offers two interdisciplinary programs leading to the degrees of Master of Arts in the field of women's studies and Master of Arts in the field of public policy with a concentration in women's studies. Both are directed by the Committee on Women's Studies and draw upon faculty from various departments within the University and resource persons in the community.

The women's studies programs seek to examine and integrate the contributions of established academic disciplines to an understanding of the historical and contemporary role and status of women, and to provide training necessary to evaluate and formulate equitable public policy for women. Each student will work closely with an advisor in designing a program to meet individual research interests and professional goals. Prospective degree candidates should consult with the director of the Women's Studies Program.

*Master of Arts in the field of women's studies and Master of Arts in the field of public policy with a concentration in women's studies*—Prerequisite: a bachelor's degree from an accredited college or university.

Required: the general requirements stated under Columbian College and Graduate School of Arts and Sciences, and 36 credit hours of course work, with or without a thesis. All students must take a common core of women's studies courses: WStu 220, 221, 225, and a final 6 hours of either WStu 283 or WStu 299–300. Policy-oriented students must take four of the six courses in the public policy core (Stat 104, 183; PSc 203; Psyc 244; PPol 211; Econ 217), with Stat 104, 183, PSc 203, and Econ 217 recommended; WStu 240 may be substituted for one of the core policy courses. Of the remaining three courses, two must be in the same discipline, which may be in the humanities, social sciences, or public administration. Those pursuing the Master of Arts in the field of women's studies must take, in addition to the core courses in women's studies, 12 credit hours in one other discipline (history, literature, economics, philosophy, religion, anthropology, or sociology) and 9 hours of electives. With permission, other disciplinary concentrations may be selected. All candidates are required to pass a Master's Comprehensive Examination.

**Note:** Prerequisite to all graduate-level women's studies courses: WStu 120 and 125 or equivalent, or permission of instructor.

**220 Historical Feminist Theory (3)**

Palmer

Same as AmCv 220. The historical development of feminist theory in Europe and the United States from the 1790s to the 1940s, focusing on feminist uses of and responses to enlightenment liberalism, social Darwinism and other biologically based social theories, Marxism, Freudianism, and existentialism. Theories are examined in the context of women's movements for social justice. (Fall)

**221 Research Issues in Women's Studies (3)**

Deitch

Analysis of the contribution of feminist or gender-relations perspectives from humanities and social science disciplines to the issues and methods of social research and social policy and practice. Topics include a review of feminist frameworks, a critique and re-evaluation of traditional academic disciplines, and analysis of current research on and for women. (Fall)

**225 Contemporary Feminist Theory (3)**

Douglas

Developments in feminist theory in the past 20 years, with a primary focus on American feminism and some consideration of European and Third World thought. (Spring)

**240 Women and Public Policy (3)**

Deitch

Basic steps in systematic policy analysis and comparison of genderless analyses with those based on gender. Application of analyses to specific U.S. policy issues, such as domestic violence, military service, abortion rights, equal employment opportunity, child and dependent care, welfare, social security, and international development assistance. (Spring)



- 241 **Women and the Law** (3) Zavos  
Legal status of women. Emphasis on marital status, employment, media, education, health services, crime, and the Constitution. (Fall)
- 251 **Women, Literature, and the Arts** (3) Romines, Tate  
Same as Engl 251. Examination of stereotypes, themes, language, patterns, and symbolism in works by and about women. Particular attention to the woman as artist and the development of feminist criticism. (Fall)
- 260 **Women and Work in the United States** (3) Palmer  
Theoretical approaches, from the perspectives of several disciplines, to explanations of the movement of women between paid employment in the labor force and unpaid employment outside the labor force since 1945. The persistence of job-related gender and racial discrimination and of income differentials by gender. Prerequisite: Econ 11-12 or 217. Same as AmCv 260 and Econ 141.
- 270 **Seminar: Selected Topics** (3) Staff  
Investigation of a current policy issue of particular concern to women, or consideration of women's status in a particular social system. (Fall and spring)
- 280 **Independent Study** (3) Staff  
May be repeated for credit. Arrangements must be made with sponsoring faculty member prior to registration.
- 283 **Practicum in Women's Studies** (6) Staff  
Study of the changing status of women through supervised assignment to public and private agencies engaged in policymaking, education, political action, and research. Placement arrangements begin the semester prior to registration for this course.
- 295 **Independent Research in Women's Studies** (arr.) Staff  
Individual library or field research. Program advisor's approval of a written proposal required.
- 299-300 **Thesis Research** (3-3) Staff

## FACULTY AND STAFF OF INSTRUCTION 1992-1993

**Columbian College and Graduate School of Arts and Sciences**

**School of Business and Public Management**

**School of Education and Human Development**

**School of Engineering and Applied Science**

**Elliott School of International Affairs**

**Myrna J. Aavedal, Associate Professorial Lecturer in Environmental Science**  
B.S. 1966, Philadelphia College of Pharmacy and Science; M.S. 1964, University of Pennsylvania;  
M.S. 1966, Ph.D. 1969, University of Wisconsin

**Andreas Andrew Abraham, Associate Professor of Pathology**  
M.D. 1953, University of Szeged, Hungary

**Fred Paul Abramson, Professor of Pharmacology**  
B.A. 1962, Case Western Reserve University; Ph.D. 1965, Ohio State University

**Eugene Abravanel, Professor of Psychology**  
B.A. 1955, University of Michigan; M.A. 1960, Swarthmore College; Ph.D. 1965, University of  
California, Berkeley

**Ravi S. Achrol, Associate Professor of Marketing, Logistics, and Operations  
Management**  
B Comm. 1967, Delhi University, India; M Comm. 1973, Rajasthan University, India; Ph.D. 1985,  
Northwestern University

**Achilles Grammenos Adamantiades, Adjunct Professor of Engineering**  
Diploma 1957, National Polytechnic, Greece; Ph.D. 1966, Massachusetts Institute of Technology

**William Clayton Adams, Professor of Public Administration**  
B.A. 1971, M.A. 1972, Baylor University; Ph.D. 1977, George Washington University

**Sankar L. Adhya, Adjunct Professor of Genetics**  
B.S. 1958, M.S. 1960, Ph.D. 1963, University of Calcutta, India; Ph.D. 1967, University of  
Wisconsin

**Joseph Morris Aein, Adjunct Professor of Engineering**  
B.S. 1958, Massachusetts Institute of Technology; M.S.E.E. 1958, Ph.D. 1962, Purdue University

**Lewis Francis Affronti, Professor of Microbiology and Immunology**  
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke University

**Hugh Lecaine Agnew, Associate Professor of History and International  
Affairs**  
B.A. 1975, Queen's University at Kingston, Canada; M.A. 1976, Ph.D. 1981, Stanford University

**Mohamed Abd El-Aziz Ahmed, Associate Professorial Lecturer in  
Engineering**  
B.S. 1976, Diploma 1980, Helwan University, Egypt; M.S. 1983, D.Sc. 1988, George Washington  
University

**Yoshio Akiyama, Professorial Lecturer in Mathematics**  
M.A. 1963, Andrews University; Ph.D. 1967, University of Minnesota

**Julia W. Albright, Professor of Microbiology and Immunology**  
B.S. 1962, East Tennessee State University; M.S. 1972, University of Akron; Ph.D. 1978, Indiana  
State University

**Marshall W. Alcorn, Jr., Associate Professor of English**  
B.A. 1970, Texas Lutheran College; M.A. 1976, Vanderbilt University; Ph.D. 1981, University of  
Texas

**Charles Alexander, Jr., Adjunct Professor of Engineering**  
B.S. 1962, Lowell Technological Institute; M.S. 1965, University of New Hampshire; Ph.D. 1973,  
University of Maryland

**Nikitas Anestis Alexandridis, Professor of Engineering and Applied Science**  
B.S.E.E. 1966, Ohio University; M.S. 1967, Ph.D. 1971, University of California, Los Angeles

**M.H. Alhabashi, Assistant Professorial Lecturer in Engineering**  
B.S. 1984, D.Sc. 1991, George Washington University; M.S. 1985, University of Maryland



- Frank Allario, Associate Professorial Lecturer in Engineering**  
B.S. 1962, Manhattan College; M.S. 1965, Ph.D. 1968, Polytechnic University; M.B.A. 1978, Stanford University
- Catherine Jean Allen, Professor of Anthropology**  
B.A. 1969, St. John's College, Maryland; M.A. 1972, Ph.D. 1978, University of Illinois
- Andrew Altman, Associate Professor of Philosophy**  
B.A. 1972, M.Phil. 1975, Ph.D. 1977, Columbia University
- Frederick Amling, Professor of Business Finance**  
B.A. 1948, Baldwin-Wallace College; M.B.A. 1949, Miami University; Ph.D. 1957, University of Pennsylvania
- Jeffrey Clifford Anderson, Professor of Art**  
B.A. 1970, University of Pittsburgh; M.F.A. 1973, Ph.D. 1976, Princeton University
- Lowell Bruce Anderson, Professorial Lecturer in Engineering**  
B.E.S. 1965, Johns Hopkins University; M.S. 1968, Ph.D. 1971, Northwestern University
- Avery DeLano Andrews, Associate Professor of History; Assistant Dean of Columbian College and Graduate School of Arts and Sciences**  
B.A. 1950, Harvard University; LL.B. 1953, M.A. 1958, Ph.D. 1962, University of Pennsylvania
- Garth R. Andrus, Assistant Professor of Human Services**  
B.S. 1984, M.A. 1986, Brigham Young University; Ed.D. 1988, Vanderbilt University
- Charles Anello, Professorial Lecturer in Engineering**  
B.S. 1958, Towson State University; Sc.M. 1962, Sc.D. 1964, Johns Hopkins University
- Richard D. Angelari, Associate Professorial Lecturer in Engineering**  
B.E.E. 1956, M.E.E. 1963, Polytechnic University; Ph.D. 1975, New York University
- Ricardo Anzola-Betancourt, Adjunct Professor of Travel and Tourism**  
B.Arch. 1969, Cornell University
- Ernest Stokes Armstrong, Assistant Professorial Lecturer in Engineering**  
B.S. 1959, M.S. 1961, Clemson University; Ph.D. 1967, North Carolina State University
- John Martin Artz, Assistant Professor of Management Science**  
B.S. 1974, James Madison University; M.S. 1976, University of Florida; M.B.A. 1981, Ph.D. 1990, George Washington University
- Joseph Aschheim, Professor of Economics**  
B.A. 1951, University of California, Berkeley; M.A. 1953, Ph.D. 1954, Harvard University
- Hossein G. Askari, Professor of International Finance**  
B.S. 1966, Ph.D. 1970, Massachusetts Institute of Technology
- Clifford J. Astill, Professorial Lecturer in Engineering**  
B.E. 1958, University of Queensland; M.S. 1966, D.Sc. 1971, Columbia University
- Muriel Ann Atkin, Associate Professor of History**  
B.A. 1967, Sarah Lawrence College; M.Phil. 1971, Ph.D. 1976, Yale University
- David Lynn Atkins, Professor of Biology**  
B.A. 1957, University of Texas; M.A. 1963, East Texas State University; Ph.D. 1970, Texas A&M University
- Julius Axelrod, Professorial Lecturer in Pharmacology**  
B.S. 1933, City University of New York, City College; M.A. 1941, New York University; Ph.D. 1955, LL.D. 1971, George Washington University; Sc.D. 1966, University of Chicago
- Murat Azizoglu, Assistant Professor of Engineering and Applied Science**  
B.S. 1985, Middle East Technical University, Turkey; M.S. 1987, Ohio State University; Ph.D. 1991, Massachusetts Institute of Technology
- William R. Baber, Benjamin Franklin Professor of Accountancy**  
B.S. 1969, Bucknell University; M.B.A. 1973, University of Pittsburgh; Ph.D. 1980, University of North Carolina
- William Back, Adjunct Professor of Geology**  
B.S. 1948, University of Illinois; M.S. 1955, University of California, Berkeley; M.P.A. 1956, Harvard University; Ph.D. 1969, University of Nevada
- Mary Jo Baedecker, Assistant Professorial Lecturer in Geology**  
B.A. 1964, Vanderbilt University; M.S. 1967, University of Kentucky; Ph.D. 1985, George Washington University
- Prabir K. Bagchi, Associate Professor of Business Administration**  
B.S. 1969, University of Calcutta, India; M.S. 1984, Ph.D. 1986, University of Tennessee
- Frank E. Baginski, Associate Professor of Mathematics**  
B.S. 1975, Gannon University; M.S. 1977, Purdue University; Ph.D. 1985, University of Massachusetts
- Erin Todd Bailey, Instructor in Administrative Sciences**  
B.A. 1980, M.A. 1986, George Washington University
- John Martyn Bailey, Professor of Biochemistry and Molecular Biology**  
B.S. 1949, Ph.D. 1952, D.Sc. 1970, University of Wales

**Mary Ann Bailly, Adjunct Associate Professor of Economics**

B.A. 1964, Radcliffe College; M.A. 1968, Northwestern University; Ph.D. 1974, Massachusetts Institute of Technology

**Raymond P. Bain, Associate Research Professor of Statistics**

B.A. 1975, Franklin and Marshall College; Ph.D. 1981, Emory University

**James D. Baker, Professorial Lecturer in Administrative Sciences**

B.A. 1952, M.A. 1955, West Virginia University; Ph.D. 1985, Catholic University of America

**John C. Baker, Professorial Lecturer in Telecommunication**

B.A. 1981, Ph.D. 1967, University of California

**Maria Mercedes Balbe ter Matt, Clinical Instructor in Art Therapy**

B.A. 1984, University of North Carolina; M.A. 1986, George Washington University

**Judith Banister, Professorial Lecturer in Geography and Regional Science**

B.A. 1965, Swarthmore College; Ph.D. 1978, Stanford University

**Vanessa M. Barnabei, Assistant Professor of Obstetrics and Gynecology and of Genetics**

Ph.D. 1980, M.D. 1985, University of Virginia

**Albert Barnhart, Associate Professorial Lecturer in Art**

B.A. 1970, University of Maryland; M.A. 1974, State University of New York College at Oswego

**Theodore M. Barnhill, Professor of Finance**

B.S. 1968, Tennessee Technological University; M.S. 1969, M.B.A. 1971, Ph.D. 1974, University of Michigan

**Richard Walker Barnwell, Professorial Lecturer in Engineering**

B.S. 1961, M.S. 1962, Auburn University; Ph.D. 1968, Virginia Polytechnic Institute and State University

**Brenda C. Barthell, Lecturer in Art Therapy**

B.A. 1983, Northwestern University; M.A. 1985, George Washington University

**Jane Barton, Adjunct Instructor in Teacher Education**

B.S. 1965, University of Bridgeport; M.Ed. 1969, University of Maryland; M.A. 1977, University of Connecticut

**Nicholas L. Basdekas, Professorial Lecturer in Engineering**

B.S. 1954, M.S. 1955, C.E. 1958, Columbia University; Ph.D. 1969, Catholic University of America

**James F. Battey, Adjunct Associate Professor of Genetics**

B.S. 1974, California Institute of Technology; M.D., Ph.D. 1980, Stanford University

**William A. Bayse, Associate Professorial Lecturer in Forensic Sciences**

B.S. 1958, Roanoke College; M.S. 1973, American University

**J. Howard Beales III, Associate Professor of Strategic Management and Public Policy**

B.A. 1972, Georgetown University; Ph.D. 1978, University of Chicago

**Joyce K. Beam, Adjunct Assistant Professor of Teacher Preparation and Special Education**

B.S. 1973, Bloomsburg State College; M.A. in Ed. 1977, Ed.D. 1992, George Washington University

**Lucille Bluso Beck, Associate Professorial Lecturer in Speech and Hearing**

B.A. 1971, Adelphi University; M.A. 1973, Ph.D. 1978, University of Maryland

**Sylvén Seid Beck, Assistant Professor of Elementary Education**

B.A. 1972, Marymount Manhattan College; M.S. in Ed. 1974, City University of New York, City College; Ed.D. 1981, George Washington University

**Kenneth Louis Becker, Professor of Medicine and of Physiology**

B.A. 1952, University of Michigan; M.D. 1956, New York Medical College; Ph.D. 1963, University of Minnesota

**William H. Becker, Professor of History**

B.A. 1964, Muhlenberg College; Ph.D. 1969, Johns Hopkins University

**Nabih Elias Bedewi, Associate Professor of Engineering and Applied Science**

B.S. 1983, M.S. 1984, Ph.D. 1986, University of Maryland

**Faye Z. Belgrave, Associate Professor of Psychology**

B.S. 1972, North Carolina Agricultural and Technical State University; M.A. 1974, University of Nebraska; Ph.D. 1982, University of Maryland

**Nancy Joan Belknap, Professor of Special Education**

B.S. 1966, University of Michigan; M.A. in Ed. 1970, George Washington University; Ed.D. 1978, American University

**Richard S. Belous, Associate Professorial Lecturer in Administrative Sciences and in Telecommunication**

B.A. 1971, Columbia University; M.A. 1977, Ph.D. 1984, George Washington University

**Nancy L. Benco, Associate Professorial Lecturer in Anthropology**

B.A. 1966, Wittenberg University; M.A. 1981, George Washington University; Ph.D. 1986, State University of New York at Binghamton



- Cornelius Bennhold, Assistant Professor of Physics**  
B.S. 1981, B.S. 1982, Mainz University, Germany; Ph.D. 1987, Ohio University
- John William Benoit, Professorial Lecturer in Engineering**  
B.S. 1952, University of Washington; M.S. 1954, North Carolina State University at Raleigh; Ph.D. 1961, Princeton University
- Stewart Woodruff Bentley, Sr., Assistant Professorial Lecturer in Forensic Sciences**  
B.A. 1964, George Washington University; M.A. 1973, University of Oklahoma
- Nancy O. Berger, Visiting Assistant Professor of Human Resource Development**  
B.A. 1973, Thiel College; M.A. 1977, University of Virginia; Ph.D. 1990, Virginia Commonwealth University
- Otto Bergmann, Professor of Physics**  
Ph.D. 1949, University of Vienna
- Simon Y. Berkovich, Professor of Engineering and Applied Science**  
M.S. 1960, Moscow Physical-Technical Institute, Russia; Ph.D. 1964, Institute of Precise Mechanics and Computer Technology, Russia
- Edward David Berkowitz, Professor of History**  
B.A. 1972, Princeton University; M.A. 1973, Ph.D. 1976, Northwestern University
- Barry Louis Berman, Professor of Physics**  
B.A. 1957, Harvard University; M.S. 1959, Ph.D. 1963, University of Illinois
- Jerald Jack Bernstein, Research Professor of Neurological Surgery and of Physiology**  
B.A. 1955, City University of New York, Hunter College; M.S. 1957, Ph.D. 1959, University of Michigan
- Neil Z. Bien, Assistant Clinical Professor of Psychology**  
B.S. 1970, Tulane University; Ph.D. 1975, Rutgers University
- Barnes Reed Bierck, Assistant Professor of Engineering and Applied Science**  
B.S. 1972, M.Eng. 1981, Rensselaer Polytechnic University; M.Sc. 1975, Tulane University; Ph.D. 1988, Cornell University
- Mitat A. Birkan, Professorial Lecturer in Engineering**  
B.S. 1973, M.S. 1975, Technical University of Istanbul; Ph.D. 1984, University of Colorado
- Philip Stanley Birnbaum, Professor of Health Care Sciences and of Health Services Administration**  
B.S. in M.E. 1948, M.S. in M.E. 1949, Carnegie-Mellon University; B.C.E. 1954, Rensselaer Polytechnic Institute
- Laura N. Birou, Assistant Professor of Logistics and Operations Management**  
B.A. 1982, M.B.A. 1983, Ph.D. 1992, Michigan State University
- William Thomas Bisignani, Professorial Lecturer in Engineering**  
B.S. 1961, M.S. 1962, Ph.D. 1972, Rutgers University
- David Bjelajac, Associate Professor of Art**  
B.A. 1972, M.A. 1973, University of Wisconsin; Ph.D. 1980, University of North Carolina
- Richard R. Blanchard, Professorial Lecturer in Engineering**  
B.S. in E.E. 1964, M.S. in E.E. 1966, University of Vermont; M.E.A. 1972, George Washington University
- Peter S. Bock, Professor of Engineering**  
B.A. 1962, Ripon College; M.S. 1964, Purdue University
- William James Boettinger, Professorial Lecturer in Engineering**  
B.E.S. 1968, Ph.D. 1972, Johns Hopkins University
- Ronald Carl Bohn, Associate Professor of Anatomy**  
B.S. 1973, M.S. 1976, Pennsylvania State University; Ph.D. 1980, State University of New York Upstate Medical Center
- Judy Bolz, Adjunct Assistant Professor in English**  
B.A. 1971, M.F.A. 1973, Cornell University
- Joseph Edmond Bonin, Assistant Professor of Mathematics**  
B.A. 1984, Assumption College; M.A. 1986, Ph.D. 1989, Dartmouth College
- Giorgio Vittorio Borgiotti, Professor of Engineering and Applied Science**  
Eng.Dr. 1957, University of Rome, Italy
- John Borriello, Clinical Professor of Psychology**  
B.A. 1952, M.Ed. 1953, Boston University; Ph.D. 1957, University of Minnesota
- Gerald Michael Borsuk, Professorial Lecturer in Engineering**  
B.S. 1966, M.S. 1969, Ph.D. 1972, Georgetown University
- Sudip Bose, Assistant Professor of Statistics**  
B.Sc. 1982, Calcutta University, India; M.S. 1984, Indian Statistical Institute, India; Ph.D. 1990, Purdue University

- John Gordon Boswell, Professor of Education**  
B.A. in Ed. 1953, M.A. in Ed. 1956, Ed.D. 1963, George Washington University
- Nirmala Devi Cherukupalle Boughey, Associate Professorial Lecturer in Engineering**  
B.S. 1958, M.A. 1959, Madras University, India; M.R.P. 1964, Ph.D. 1967, Harvard University
- Bryan L. Boulter, Professor of Economics**  
B.A. 1967, North Carolina State University; M.A. 1969, Ph.D. 1974, Princeton University
- George McMillan Bowles, Adjunct Associate Professor of Philosophy**  
B.A. 1966, University of Denver; Ph.D. 1970, Stanford University
- Roland Lee Bowles, Associate Professorial Lecturer in Engineering**  
B.S. 1959, Randolph-Macon College; M.S. 1961, Ph.D. 1971, University of Virginia
- Kenneth R. Bowling, Adjunct Associate Professor of History**  
B.A. 1962, Dickinson College; M.A. 1964, Ph.D. 1968, University of Wisconsin
- Lloyd Spencer Bowling, Professor of Speech and Hearing**  
B.A. 1954, M.A. 1957, Ed.D. 1964, University of Maryland
- Eileen Walkovich Bradley, Adjunct Professor of Radiology**  
B.A. 1966, Anne Maria College; M.S. 1968, D.Sc. 1971, Harvard University
- Michael D. Bradley, Professor of Economics**  
B.S. 1975, University of Delaware; Ph.D. 1982, University of North Carolina
- John Brady, Adjunct Professor of Genetics**  
B.A. 1973, M.A. 1975, Southern Illinois University; Ph.D. 1978, Kansas State University
- Linda J. Brandt, Associate Professor of Psychology**  
B.A. 1963, Elmhurst College; M.A. 1965, Clark University; Ph.D. 1973, University of London
- Jacob I. Bregman, Professorial Lecturer in Engineering**  
B.S. 1943, Providence College; M.S. 1948, Ph.D. 1951, Polytechnic University
- Alan L. Breitler, Associate Professorial Lecturer in Engineering**  
B.A. 1960, Florida State University; M.A. in Ed. 1966, George Washington University; Ph.D. 1975, Catholic University of America
- Michael Keith Brett-Surman, Assistant Professorial Lecturer in Geology**  
B.A. 1968, University of Colorado; M.A. 1975, University of California; M.A. 1979, Johns Hopkins University; M.Phil. 1985, George Washington University
- Mary Diane Majerus Brewer, Associate Professor of Speech and Hearing**  
B.A. 1963, M.A. 1965, University of Iowa
- George Roy Brier, Professor of Engineering Management**  
B.S. 1946, University of South Carolina; B.S. 1961, Naval Postgraduate School; M.S. 1967, D.Sc. 1990, George Washington University
- William John Briscoe, Associate Professor of Physics**  
B.A. 1970, Ph.D. 1978, Catholic University of America; M.A. 1972, Northeastern University
- James Thomas Broach, Associate Professorial Lecturer in Physics**  
B.S. 1960, Louisiana State University; M.S. 1975, Ph.D. 1981, American University
- Gerald W. Brock, Professor of Telecommunication**  
B.A. 1970, Ph.D. 1973, Harvard University
- Laurie A. Broedling, Professorial Lecturer in Administrative Sciences**  
B.A. 1967, Brown University; M.A. 1969, Ph.D. 1973, George Washington University
- Joseph B. Bronder, Assistant Professorial Lecturer in Engineering**  
B.S. 1955, University of Dayton; M.A. 1957, Washington University; Ph.D. 1965, University of Arizona
- Alison Spence Brooks, Professor of Anthropology**  
B.A. 1965, Radcliffe College; M.A. 1967, Ph.D. 1979, Harvard University
- Barry Allan Brower, Associate Professorial Lecturer in Engineering**  
B.S. 1971, New Jersey Institute of Technology; M.E.A. 1977, George Washington University
- Carole Williams Brown, Assistant Professor of Special Education**  
B.A. 1972, Earlham College; M.A. in Ed. 1976, Ed.D. 1987, George Washington University
- Kenneth Michael Brown, Associate Professor of Biology and of Genetics**  
B.S. 1973, Ph.D. 1982, Michigan State University; M.S. 1975, University of Florida
- Nathan Jude Brown, Associate Professor of Political Science and International Affairs; Associate Dean of the Elliott School of International Affairs**  
B.A. 1980, University of Chicago; M.A. 1983, Ph.D. 1986, Princeton University
- Barbara Cole Browne, Visiting Assistant Professor of Special Education**  
B.S. 1964, St. Lawrence University; M.A. in Ed&HD 1982, Ed.D. 1989, George Washington University
- Debra Ann Bruno, Adjunct Instructor in English**  
B.A. 1979, State University of New York at Oneonta; M.A. 1981, Boston College



- David Brusick, Adjunct Associate Professor of Genetics**  
B.S. 1963, University of Illinois; M.S. 1965, Ph.D. 1970, Illinois State University
- Philip N. Bryan, Adjunct Assistant Professor of Genetics**  
B.A. 1975, Ph.D. 1979, University of Tennessee
- Sarah Katherine Bryant, Assistant Professor of Finance**  
B.S. 1979, Ph.D. 1985, University of South Carolina
- Peter Budetti, Harold and Jane Hirsh Professor of Health Care Law and Policy; Professor of Law and of Health Care Sciences**  
B.A. 1966, University of Notre Dame; M.D. 1970, Columbia University; J.D. 1977, University of California
- Lonnie G. Bunch III, Assistant Professorial Lecturer in Museum Studies**  
B.A. 1974, M.A. 1975, American University
- Cynthia Burack, Assistant Professor of Political Science**  
B.A. 1981, West Virginia University; M.A. 1987, Ph.D. 1991, University of Maryland
- Robert Frank Burch, Professorial Lecturer in Engineering**  
B.S.C.E. 1946, University of Kansas; M.S. 1963, Naval Postgraduate School
- Ben Burdetsky, Professor of Personnel and Labor Relations and of Public Administration**  
B.S. 1950, M.S. 1958, Temple University; Ph.D. 1968, American University
- Legand L. Burge, Associate Professorial Lecturer in Engineering**  
B.S. 1972, M.S. 1973, Ph.D. 1979, Oklahoma State University
- Lee Burke, Assistant Professor of Business Administration**  
B.A. 1979, Ph.D. 1990, University of California; M.S.M. 1982, Purdue University
- John Robert Burns, Associate Professor of Zoology**  
B.S. 1968, City University of New York, Brooklyn College; M.S. 1972, Ph.D. 1974, University of Massachusetts
- William Dickinson Burrows, Associate Professorial Lecturer in Engineering**  
B.A. 1953, Cornell University; Ph.D. 1956, Stanford University; M.S. 1973, Vanderbilt University
- Robert L. Butterworth, Adjunct Professor of International Affairs and Political Science**  
B.A. 1967, University of Washington; M.A. 1969, Ph.D. 1973, University of California, Berkeley
- Sheila M. Cahill, Adjunct Assistant Professor of Special Education**  
B.A. 1974, Marymount College of Virginia; M.A. 1978, Ed.D. 1987, George Washington University
- Susan J. Callaway, Instructor in English**  
B.A. 1981, University of Wisconsin; M.A. 1983, Brown University
- Wayne J. Camara, Associate Professorial Lecturer in Administrative Sciences**  
B.A. 1978, Southeastern Massachusetts University; M.A. 1980, Rhode Island College; Ph.D. 1986, University of Illinois
- Linda A. Camino, Assistant Research Professor of Anthropology**  
B.A. 1979, M.A. 1980, Ph.D. 1986, University of Virginia
- Vincent Neal Campbell, Visiting Associate Professor of Administrative Sciences**  
B.A. 1953, University of California, Berkeley; M.S. 1955, Iowa State University; Ph.D. 1960, University of Colorado
- Robert D. Caplan, Professor of Psychology and of Psychiatry and Behavioral Sciences**  
B.A. 1964, University of California, Los Angeles; M.S. 1966, San Francisco State University; Ph.D. 1971, University of Michigan
- Michael F. Card, Professorial Lecturer in Engineering**  
B.S. 1959, Massachusetts Institute of Technology; M.S. 1964, Ph.D. 1970, Virginia Polytechnic Institute and State University
- Edward Alan Caress, Professor of Chemistry; Associate Dean of Columbian College and Graduate School of Arts and Sciences**  
B.A. 1958, Dartmouth College; Ph.D. 1963, University of Rochester
- Caren M. Carney, Assistant Professorial Lecturer in Psychology**  
B.A. 1973, Marywood College; M.A. in Sp.Std. 1978, Ph.D. 1985, George Washington University
- Robert L. Carroll, Jr., Professor of Engineering and Applied Science**  
B.S. 1967, North Carolina State University at Raleigh; M.Phil. 1970, Yale University; Ph.D. 1973, University of Connecticut
- Thomas Frank Carroll, Adjunct Professor of Economics and of Urban and Regional Planning**  
B.A. 1942, Case Western Reserve University; M.S. 1947, Ph.D. 1950, Cornell University

- Barbara Gilbert Carson, Associate Professorial Lecturer in American Civilization and in Art History**  
B.A. 1963, Brown University; M.A. 1965, University of Delaware
- John H. Carson, Professor of Management Science**  
B.S. in E.E. 1969, M.S. 1970, Ph.D. 1976, Lehigh University
- Donna Marie Carter, Instructor in English**  
B.A. 1978, M.A. 1984, George Washington University
- Geoffrey Carter, Associate Professor of English**  
B.A. 1963, Cambridge University; Ph.D. 1969, University of Pennsylvania
- Joye M. Carter, Associate Professorial Lecturer in Forensic Sciences**  
B.A. 1979, Wittenberg University; M.D. 1983, Howard University
- Marie Mullaney Cassidy, Professor of Physiology**  
B.S. (General) 1957, B.S. (Special) 1958, M.S. 1959, Ph.D. 1962, National University of Ireland
- Michael Scott Castleberry, Professor of Special Education**  
B.A. 1966, University of North Carolina; M.A. in Ed. 1972, Ed.D. 1973, George Washington University
- Bayard Lacey Catron, Professor of Public Administration**  
B.A. 1963, Grinnell College; M.A. 1965, University of Chicago; M.C.P. 1972, Ph.D. 1975, University of California, Berkeley
- Peter James Caws, University Professor of Philosophy**  
B.Sc. 1952, University of London; M.A. 1954, Ph.D. 1956, Yale University
- Neal Eric Chalofsky, Associate Professor of Human Resource Development**  
B.S. 1966, Temple University; M.B.A. 1968, American University; Ed.D. 1976, George Washington University
- William J. Chambliss, Professor of Sociology**  
B.A. 1955, University of California, Los Angeles; M.A. 1960, Ph.D. 1962, Indiana University
- Promod Chandhok, Assistant Professorial Lecturer in Statistics**  
B.A. 1972, M.A. 1974, Lucknow University, India; M.S. 1978, Ph.D. 1982, Iowa State University
- Chun-houh Chen, Assistant Professor of Statistics**  
B.A. 1984, National Chung Hsing University, Taiwan; M.A. 1990, Ph.D. 1991, University of California, Los Angeles
- Mike C. Chen, Associate Professorial Lecturer in Engineering**  
B.S. 1969, National Tsing-Hua University, Taiwan; M.S. 1972, Ph.D. 1975, Kansas State University
- Edward John Cherian, Professor of Administrative Sciences**  
B.S.E.E. 1958, M.S. 1963, Ph.D. 1966, Rensselaer Polytechnic Institute
- Robert C. Chesnut, Assistant Professorial Lecturer in Forensic Sciences**  
B.A. 1981, University of Virginia; J.D. 1984, Harvard University
- Stephen Reed Chitwood, Professor of Public Administration**  
B.A. 1962, University of Colorado; M.P.A. 1965, Ph.D. 1966, University of Southern California; J.D. 1977, George Washington University
- Hyeong-Ah Choi, Associate Professor of Engineering and Applied Science**  
B.A. 1980, M.S. 1982, Seoul National University, Korea; Ph.D. 1986, Northwestern University
- Janice Y. Chou, Adjunct Associate Professor of Genetics**  
B.S. 1983, National Taiwan University; M.A. 1985, Ph.D. 1988, University of Utah
- Patricia Sari Christensen, Assistant Professor of Elementary Education**  
B.S. 1970, Old Dominion University; M.Ed. 1976, George Mason University; Ph.D. 1987, University of Maryland
- Patricia Chu, Assistant Professor of English**  
B.A. 1981, Yale University; M.A. 1989, Ph.D. 1992, Cornell University
- Robert Paul Churchill, Professor of Philosophy**  
B.A. 1969, M.A. 1972, Ph.D. 1975, Johns Hopkins University
- Maxine D. Clair, Assistant Professor of English**  
B.S. 1963, University of Kansas; M.F.A. 1984, American University
- William Edward Clancy, Assistant Professorial Lecturer in Forensic Sciences**  
B.A., M.A. 1975, City University of New York, John Jay College; J.D. 1982, St. John's University
- Malcolm P. Clark, Associate Professorial Lecturer in Engineering**  
B.S. in Ed. 1963, Murray State University; M.S. 1968, George Washington University
- Rolf Hans Clark, Adjunct Professor of Engineering**  
B.S. 1959, Yale University; M.S. 1966, Naval Postgraduate School; Ph.D. 1976, University of Massachusetts
- Anthony George Coates, Research Professor of Geology**  
B.S. 1959, Ph.D. 1963, University of London



- David William Coder, Adjunct Professor of Engineering  
B.S. 1937, Ph.D. 1973, University of Maryland
- Steven Charles Cogswell, Associate Professorial Lecturer in Forensic Sciences  
M.D. 1985, Medical University of South Carolina
- Debra Jo Cohen, Associate Professor of Management Science  
B.Sc. 1979, Ohio University; M.L.H.R. 1982, Ph.D. 1987, Ohio State University
- Neil Goodman Cohen, Associate Professor of Finance  
B.A. 1963, Olivet College; M.B.A. 1964, University of Michigan; D.B.A. 1975, University of Virginia
- Victor Hugo Cohn, Professor of Pharmacology  
B.S. 1952, Lehigh University; M.A. 1954, Harvard University; Ph.D. 1961, George Washington University
- Nancy Hall Colburn, Adjunct Professor of Genetics  
B.A. 1963, Swarthmore College; Ph.D. 1967, University of Wisconsin
- Robert Long Combs, Associate Professor of English  
B.A. 1968, University of Southern Mississippi; Ph.D. 1971, University of South Carolina
- James P. Connelly, Assistant Research Professor of Physics  
B.A. 1975, Saint Mary's College; B.S. 1981, Morgan State University; Ph.D. 1989, University of New Hampshire
- Joel W. Cook, Associate Professor of Business Administration  
B.S. 1971, Oklahoma State University; M.B.A. 1974, University of Tulsa; D.B.A. 1981, Indiana University
- Patrick Cook, Assistant Professor of English  
B.A. 1979, M.A. 1982, University of California
- Suzanne Durling Cook, Adjunct Instructor in Travel and Tourism  
B.S. 1973, University of Maryland; M.A. 1982, George Washington University
- James Cameron Coolbaugh, Associate Professorial Lecturer in Engineering  
B.S. 1965, California State University, Long Beach; Ph.D. 1974, Baylor College of Medicine
- David Emanuel Cooper, Assistant Clinical Professor of Psychology  
B.A. 1976, Yale University; Ph.D. 1982, George Washington University
- Joseph John Cordes, Professor of Economics  
B.A. 1971, Stanford University; M.S. 1975, Ph.D. 1977, University of Wisconsin
- Anne Corson, Adjunct Assistant Professor of Art Therapy  
B.A. 1962, Smith College; M.A. 1981, George Washington University
- James Costantino, Professorial Lecturer in Engineering  
B.S.M.E. 1958, University of Massachusetts; M.E.A. 1961, George Washington University; Ph.D. 1971, American University
- Constance Christian Costigan, Professor of Design  
B.S. 1957, Simmons College; M.A. 1965, American University
- Andrew G. Cotterman, Associate Professorial Lecturer in Engineering  
B.S. 1960, U.S. Naval Academy; M.E.A. 1985, George Washington University
- Thomas Francis Courtless, Jr., Professor of Law and Sociology  
B.A. 1955, Pennsylvania State University; M.A. 1960, Ph.D. 1966, University of Maryland
- Hugh George Courtney, Assistant Professor of Economics  
B.A. 1985, Northwestern University; Ph.D. 1991, Massachusetts Institute of Technology
- Carol Thayer Cox, Adjunct Assistant Professor of Art Therapy  
B.A. 1968, Mary Washington College; M.A. 1984, George Washington University
- John Patrick Coyne, Associate Professor of Management Science  
B.S. 1967, Iona College; M.S. 1968, Ph.D. 1970, Lehigh University
- Francesca Creo, Clinical Instructor in Art Therapy  
B.A. 1974, Ringling School of Art and Design; M.A. 1980, Carlow College
- Paul James Crepeau, Adjunct Professor of Engineering  
B.S. 1957, University of Rhode Island; M.S. 1960, Ph.D. 1967, Polytechnic University
- Pamela J. Cressey, Adjunct Associate Professor of Anthropology and of American Civilization  
B.A. 1968, University of California, Los Angeles; M.A. 1973, Ph.D. 1978, University of Iowa
- Milton Orlo Critchfield, Adjunct Professor of Engineering  
B.S. 1963, M.S. 1965, Pennsylvania State University; Ph.D. 1971, University of Illinois
- Gary Edward Crum, Associate Professor of Health Services Management and Policy and of Health Care Sciences  
B.S. 1967, College of William and Mary; M.S. 1969, Ph.D. 1972, University of Kentucky; M.P.H. 1973, Columbia University; M.A. in Sp.St. 1983, George Washington University

- Beth Blevins Cuje, *Adjunct Associate Professor of Counseling*  
B.S. 1957, Georgetown University; M.A. in Ed. 1977, Ed.D. 1984, George Washington University
- Michael Charles Cullingford, *Associate Professorial Lecturer in Engineering*  
B.Sc. 1961, University of Durham, England; M.Sc. 1966, King's College, England; Ph.D. 1975, North Carolina State University
- Willie P. Cupples, *Associate Professor of Speech and Hearing*  
B.A. 1971, Baylor University; M.A. 1972, Western Illinois University; Ph.D. 1978, Northwestern University
- Timothy J. Curry, *Professorial Lecturer in Finance*  
B.S. 1966, King's College (Pennsylvania); M.A. 1968, Pennsylvania State University; Ph.D. 1979, George Washington University
- Andrew David Cutler, *Assistant Professor of Engineering and Applied Science*  
B.Sc. 1979, Imperial College of Science and Technology, England; M.S. 1980, Ph.D. 1987, Stanford University
- Michael Francis D'Antonio, *Assistant Professorial Lecturer in Engineering*  
B.S.(E.E.) 1985, M.S. 1987, George Washington University
- William V. D'Antonio, *Adjunct Professor of Sociology*  
B.A. 1948, Yale University; M.A. 1953, University of Wisconsin; Ph.D. 1958, Michigan State University
- Lawrence Darby, *Professorial Lecturer in Telecommunication*  
B.A. 1962, Ball State University; M.A. 1967, Ph.D. 1969, Indiana University
- Kurt John Darr, *Professor of Hospital Administration and of Health Care Sciences*  
B.A. 1961, Concordia College, Minnesota; J.D. 1964, M.H.A. 1966, University of Minnesota; D.Sc. 1973, Johns Hopkins University
- John Severy Davies, Jr., *Associate Professorial Lecturer in Engineering*  
B.S. in E.E. 1966, New Mexico State University; M.S. in E.E. 1969, Ph.D. 1979, Iowa State University
- Herbert John Davis, *Professor of Business Administration*  
B.S. 1965, Villanova University; M.B.A. 1968, East Carolina University; Ph.D. 1974, Louisiana State University
- Ronald B. Davis, *Associate Professorial Lecturer in Engineering*  
B.S. 1969, University of Virginia; M.S. 1972, University of Cincinnati; M.B.A. 1979, Lynchburg College
- William A. Davis, *Professor of Public Administration*  
B.A. 1963, Amherst College; J.D. 1968, M.U.S. 1972, Yale University
- Debra L. Dean, *Visiting Assistant Professor of Public Administration*  
B.S. 1973, University of Maryland; Ph.D. 1982, Indiana University
- Jonathan Pierce Deason, *Adjunct Professor of Engineering*  
B.S. 1970, U.S. Military Academy; M.B.A. 1975, Golden Gate University; M.S. 1978, Johns Hopkins University; Ph.D. 1984, University of Virginia
- Pramote Dechaumphai, *Associate Professorial Lecturer in Engineering*  
B.S. 1974, Khon Kaen University, Thailand; M.S. 1977, Youngstown State University; Ph.D. 1982, Old Dominion University
- Christopher James Deering, *Associate Professor of Political Science; Associate Dean of Columbian College and Graduate School of Arts and Sciences*  
B.A. 1974, University of Southern California; M.A. 1975, Ph.D. 1979, University of California, Santa Barbara
- Rosalie Frances De Giovanni-Donnelly, *Adjunct Professor of Microbiology and of Genetics*  
B.A. 1947, M.A. 1953, City University of New York, Brooklyn College; Ph.D. 1961, Columbia University
- Galen Frederick De Graff, *Visiting Assistant Professor of Business Administration*  
B.S. 1973, M.B.A. 1976, University of Virginia; Ph.D. 1991, George Washington University
- David D. DeGrazia, *Assistant Professor of Philosophy and of Health Care Sciences*  
B.A. 1983, University of Chicago; M.St. 1987, Oxford University; Ph.D. 1989, Georgetown University
- Cynthia H. Deitch, *Adjunct Assistant Professor of Women's Studies and of Sociology*  
B.A. 1969, Columbia University; M.A. 1977, Ph.D. 1980, University of Massachusetts



- Edward Della Torre, Professor of Engineering and Applied Science**  
B.E.E. 1954, Polytechnic University; M.S. 1956, Princeton University; M.S. 1961, Rutgers University; D.Eng.Sc. 1964, Columbia University
- Franklin Dellon, Professorial Lecturer in Engineering**  
B.E.E. 1960, City University of New York, City College; M.S.E.E. 1963, Columbia University; Ph.D. 1968, New York University
- Lisa Ann Delpy, Assistant Professor of Exercise Science**  
B.S. 1985, California Polytechnic State University; M.S. 1988, George Mason University; Ph.D. 1991, University of New Mexico
- Basile Dendrou, Adjunct Professor of Engineering**  
Diploma 1972, Federal Polytechnic Institute of Lausanne, Switzerland; M.S. 1974, Ph.D. 1977, Purdue University
- Michael J. Dennis, Assistant Professorial Lecturer in Art**  
B.A. 1980, American University; M.F.A. 1983, George Washington University
- Diane Marie DePalma, Associate Clinical Professor of Psychology**  
B.S. 1974, Saint Peter's College; M.A. 1978, Ph.D. 1979, University of Rochester
- Linda Grant DePauw, Professor of American History**  
B.A. 1961, Swarthmore College; Ph.D. 1964, Johns Hopkins University
- David D. Derse, Adjunct Associate Professor of Genetics**  
B.S. 1973, California State University, Northridge; Ph.D. 1982, State University of New York at Buffalo
- Dennis Martin Devaney, Professorial Lecturer in Strategic Management and Public Policy**  
B.A. 1968, M.A. 1970, University of Maryland; J.D. 1975, Georgetown University
- Donald Wilson Dew, Research Professor of Counseling**  
B.S. 1964, University of Baltimore; M.S. 1970, Medical College of Virginia of Virginia Commonwealth University; Ed.D. 1976, American University
- Kalvir S. Dhuga, Assistant Professor of Physics**  
B.Sc. 1976, Ph.D. 1980, University of Birmingham, England
- Robert Dillon, Professorial Lecturer in Engineering**  
B.A. 1949, University of Washington; M.A. in Arch. 1952, University of Florida
- Audrey Jane Di Maria, Adjunct Assistant Professor of Art Therapy**  
B.A. 1971, Keene State College; M.A. 1977, George Washington University
- Alfred Ludwig Dinsenhacher, Assistant Professorial Lecturer in Engineering Technology**  
B.C.E. 1960, City University of New York, City College; M.S. 1962, Massachusetts Institute of Technology
- James Fearing Dinwiddie, Professor of Engineering Management**  
B.S. 1948, Carnegie Institute of Technology; M.S. 1956, North Carolina State University; M.S. 1966, Ph.D. 1972, Stanford University
- Salvatore Frank Divita, Professor of Marketing**  
B.I.E. 1953, New York University; M.B.A. 1956, Ohio State University; D.B.A. 1968, Harvard University
- Nancy M. Dixon, Associate Professor of Administrative Sciences**  
B.A. 1965, University of Kansas; M.A. 1970, East Texas State University; Ph.D. 1976, North Texas State University
- Robert Paul Donaldson, Professor of Biology**  
B.A. 1964, University of Texas; M.S. 1966, Miami University; Ph.D. 1971, Michigan State University
- John Donelson III, Professorial Lecturer in Engineering**  
B.A. 1963, Yale University; Ph.D. 1971, Stanford University
- Michael Lee Donnell, Associate Professor of Engineering Management**  
B.A. 1972, Rice University; M.A. 1974, M.A. 1975, Ph.D. 1977, University of Michigan
- Richard G. Donnelly, Associate Professor of Management Science**  
B.S.E. 1967, University of Michigan; Ph.D. 1972, Massachusetts Institute of Technology
- Stephen Charles Dopkins, Assistant Professor of Psychology**  
B.A. 1974, Oberlin College; M.A. 1983, Ph.D. 1988, Columbia University
- Carol Anne Douglas, Associate Professorial Lecturer in Women's Studies**  
B.A. 1968, M.A. 1969, University of California, Los Angeles
- Gordon Baker Dove, Professorial Lecturer in Engineering**  
B.S. 1970, Lehigh University; M.S. 1988, George Washington University
- Miriam Violet Wein Dow, Assistant Professor of English**  
B.A. 1959, University of Akron; M.A. 1960, University of Michigan; Ph.D. 1977, University of Maryland
- Roger W. Doyon, Associate Professorial Lecturer in Engineering**  
B.S. in C.E. 1957, University of New Hampshire; M.E.A. 1964, George Washington University

- Burkhard Drees, Assistant Professor of Economics**  
Dipl. 1983, University of Augsburg, Germany; Ph.D. 1989, University of Minnesota
- William Drohan, Adjunct Associate Professor of Genetics**  
B.A. 1969, Ph.D. 1974, University of California, Los Angeles
- Paul Brooks Duff, Assistant Professor of Religion**  
B.A. 1974, M.A. 1979, University of Miami; Ph.D. 1988, University of Chicago
- Michael Robert Duffey, Assistant Professor of Engineering Management**  
B.A. 1982, Trinity College; B.S. 1985, M.S.M.E. 1987, Ph.D. 1992, University of Massachusetts
- Charles Earl Dunham, Professorial Lecturer in Engineering**  
B.S. 1963, Rochester Institute of Technology; M.S. in E.E. 1966, Ph.D. 1972, Syracuse University
- Robert Martin Dunn, Jr., Professor of Economics**  
B.A. 1960, Williams College; M.A. 1963, Ph.D. 1967, Stanford University
- Philippe Jacques Dupont, Adjunct Assistant Professor of Special Education**  
B.S. 1973, University of Southern Maine; M.A. in Ed.&H.D. 1980, Ed.D. 1985, George Washington University
- Douglas Leon Dwyer, Professorial Lecturer in Engineering**  
B.S. 1964, M.S. 1967, Ph.D. 1975, Virginia Polytechnic Institute and State University
- Brian M. Dwyer, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1982, Georgetown University; M.B.A. 1979, Golden Gate University
- Robert Frederick Dyer, Professor of Business Administration; Associate Dean of the School of Business and Public Management, for Graduate Business Programs**  
B.S. in B.A. 1965, M.B.A. 1966, Bowling Green State University; D.B.A. 1972, University of Maryland
- Maurice Alden East, Professor of International Affairs and Political Science; Dean of the Elliott School of International Affairs**  
B.A. 1963, Colgate University; M.A. 1966, Ph.D. 1969, Princeton University
- Steven Richard Eastaugh, Professor of Health Economics and Finance and of Health Care Sciences**  
B.A. 1973, M.S.P.H. 1975, Harvard University; Sc.D. 1978, Johns Hopkins University
- Robert Eliot Easton, Associate Professorial Lecturer in Forensic Sciences**  
B.A. 1982, J.D. 1965, Columbia University
- Russell Eaton III, Professorial Lecturer in Physics**  
B.A. 1962, M.A. 1964, Miami University; Ph.D. 1974, George Washington University
- Ralph Peter Eckerlin, Professorial Lecturer in Biological Sciences**  
B.A. 1960, Rutgers University; M.S. 1962, University of Miami; Ph.D. 1975, University of Connecticut
- Edgar A. Edelsack, Professorial Lecturer in Engineering**  
B.S. 1943, New York University; M.S. 1950, University of Southern California
- Burton I. Edelson, Research Professor of Engineering and Applied Science**  
B.S. 1947, U.S. Naval Academy; M.S. 1954, Ph.D. 1960, Yale University
- David Lee Edgell, Adjunct Professor of Travel and Tourism**  
B.S. 1961, University of Kansas; B.A. 1968, American University; M.A. 1970, Indiana University; Ph.D. 1976, University of Cincinnati
- Donald Ray Edmonds, Professorial Lecturer in Engineering**  
B.S. in M.E., B.A. 1960, Rutgers University; M.S. 1966, Ph.D. 1973, Ohio State University
- Lucy E. Edwards, Assistant Professorial Lecturer in Geology**  
B.A. 1972, University of Oregon; Ph.D. 1977, University of California, Riverside
- John Eftis, Professor of Engineering and Applied Science and Adjunct Professor of Applied Mathematics**  
B.C.E. 1952, City University of New York, City College; M.S. in C.E. 1958, Columbia University; D.Sc. 1967, George Washington University
- Mary Lou Egan, Assistant Professor of International Business**  
B.A. 1973, American University; M.B.A. 1981, Ph.D. 1987, George Washington University
- Robert J. Eisen, Assistant Professor of Religion**  
B.A. 1983, Yale University; Ph.D. 1992, Brandeis University
- Marvin F. Eisenberg, Professor of Engineering and Applied Science**  
B.S. in E.E. 1953, University of Miami; M.S. in Engr. 1954, Ph.D. 1961, University of Florida; P.E. 1966, George Washington University
- Howard Eisner, Professor of Engineering Management**  
B.E.E. 1957, City University of New York, City College; M.S. 1958, Columbia University; D.Sc. 1966, George Washington University
- Ahmed Mohamed El-Assal, Visiting Assistant Professor of Engineering and Applied Science**  
D.Sc. 1988, George Washington University



- Charles Arthur Eldridge, Associate Professorial Lecturer in Engineering  
B.A. 1971, Pomona College; Ph.D. 1978, Yale University
- Rodney Walter Eldridge, Professor of International Finance  
B.A. 1949, M.A. 1959, University of Vermont; Ph.D. 1966, Columbia University
- Charles Fox Elliott, Associate Professor of Political Science and International Affairs  
B.A. 1953, Ph.D. 1964, Harvard University; M.A. 1958, University of California, Berkeley
- Donald W. Ellison, Associate Professorial Lecturer in Engineering  
B.S. 1948, Tri-State College; M.P.A. 1951, Cornell University
- Paula Lisette Ellman, Assistant Clinical Professor of Psychology  
B.A. 1977, Bowdoin College; Ph.D. 1985, George Washington University
- Ernest Julius Englander, Associate Professor of Business Administration  
B.A. 1974, M.S. 1979, M.B.A. 1982, Ph.D. 1984, University of Washington
- Kie-Bum Eom, Associate Professor of Engineering and Applied Science  
B.S.E.E. 1976, Sogang University, Korea; M.S.E.E. 1978, Korea Advanced Institute of Science; M.S.E. 1983, University of Texas; Ph.D. 1986, Purdue University
- Mark J. Eppli, Visiting Assistant Professor of Urban Planning  
B.A. 1983, M.S. 1984, University of Wisconsin
- Gideon Epstein, Associate Professorial Lecturer in Forensic Sciences  
B.S. 1974, University of Nebraska; M.A.F.S. 1981, Antioch University
- Joseph Epstein, Associate Professorial Lecturer in Engineering  
B.Ch.E. 1953, Polytechnic University
- Wayne Douglas Erickson, Professorial Lecturer in Engineering  
B.S. 1954, M.S. 1955, Michigan State University; M.S. 1958, D.Sc. 1962, Massachusetts Institute of Technology
- Henry L. Ernstthal, Associate Professor of Public Administration  
B.A. 1962, Wesleyan University; J.D. 1965, Stanford University
- Henry Lawrence Eskew, Professorial Lecturer in Engineering  
B.S. 1959, M.S. 1963, Georgia Institute of Technology; M.A. 1967, Ph.D. 1988, American University
- Donald Michael Esterling, Professor of Engineering  
B.S. 1964, University of Notre Dame; M.A. 1966, Ph.D. 1968, Brandeis University
- Amitai Etzioni, University Professor  
B.A. 1954, M.A. 1956, Hebrew University; Ph.D. 1958, University of California, Berkeley
- Grace Elizabeth Orvis Evans, Professorial Lecturer in Art  
B.A. 1943, M.A. 1946, University of Minnesota
- Gordon C. Everstine, Professorial Lecturer in Engineering  
B.S. 1964, Lehigh University; M.S. 1966, Purdue University; Ph.D. 1971, Brown University
- Nabil Fahed, Associate Professorial Lecturer in Engineering  
B.E. 1981, American University of Beirut, Lebanon; M.E.A. 1982, D.Sc. 1988, George Washington University
- James Edward Falk, Professor of Operations Research  
B.E.E. 1960, University of Detroit; M.S. 1961, Ph.D. 1965, University of Michigan
- Susan Hanna Fantom, Clinical Instructor in Speech and Hearing  
B.A. 1983, M.A. 1985, Purdue University
- Fereidoun Farassat, Professorial Lecturer in Engineering  
B.E. 1967, American University of Beirut; M.S. 1970, Ph.D. 1973, Cornell University
- Thomas Charles Fearon, Associate Professor of Radiology and of Pediatrics  
B.A. 1969, Catholic University of America; Ph.D. 1975, University of Rochester
- Harvey B. Feigenbaum, Associate Professor of Political Science  
B.A. 1971, University of Virginia; M.A. 1974, C.Phil. 1977, Ph.D. 1981, University of California, Los Angeles
- James Elmer Feir, Professor of Civil Engineering  
B.S. 1950, University of Alberta, Canada; M.S. 1955, University of London; Ph.D. 1966, Cambridge University
- Carin Bea Feldman, Clinical Instructor in Speech and Hearing  
B.A. 1972, Adelphi University; M.S. 1975, City University of New York, Brooklyn College
- Michael Bliss Feldman, Professor of Engineering and Applied Science  
B.S.E. 1966, Princeton University; M.S.E. 1970, Ph.D. 1973, University of Pennsylvania
- Shaw Feng, Assistant Professorial Lecturer in Engineering  
B.S. 1979, National Taiwan University; M.S. 1984, Ph.D. 1987, University of Wisconsin
- Rolando A. Fernandez, Assistant Professorial Lecturer in Statistics  
B.S. 1970, San Augustin University, Peru; B.S. 1979, M.S. 1972, University of the District of Columbia; M.S. 1988, George Mason University

- Bo Fernhall, Associate Professor of Exercise Science**  
B.S. 1979, M.S. 1981, Southern Connecticut State College, Ph.D. 1984, Arizona State University
- Reynolds Ferrante, Professor of Education**  
B.S. 1957, Glassboro State College; M.Ed. 1961, Rutgers University; Ed.D. 1974, Pennsylvania State University
- Robin-Anne V. Ferris, Assistant Professorial Lecturer in Forensic Sciences**  
B.A. 1973, University of South Florida; M.F.S. 1990, George Washington University
- Anthony Vincent Fiocco, Professor of Operations Research and Applied Science**  
B.A. 1950, Union College, New York; Ph.D. 1967, Northwestern University
- Wilbur Bryan Fichter, Associate Professorial Lecturer in Engineering**  
B.S. 1957, Wake Forest College; M.S. 1966, Virginia Polytechnic Institute and State University; Ph.D. 1969, North Carolina State University
- Jonathan D. Fife, Professor of Education**  
B.B.A. 1965, University of Massachusetts; M.S. 1970, State University of New York at Albany; Ed.D. 1975, Pennsylvania State University
- Nicolae Filipescu, Professor of Chemistry**  
Ph.D. 1957, University of Industrial Chemistry, Polytechnical Institute, Rumania; Ph.D. 1964, M.D. 1975, George Washington University
- Judith L. Findley, Adjunct Instructor in Teacher Education**  
B.S. 1965, Northwestern University; M.A. in Ed. 1972, George Washington University
- Robert Michael Finn, Professorial Lecturer in Engineering and in Telecommunication**  
B.S. 1959, Le Moyne College; Ph.D. 1969, Syracuse University
- Martha Finnemore, Assistant Professor of International Affairs and of Political Science**  
B.A. 1982, Harvard University; M.A. 1984, University of Sydney, Australia; M.A. 1988, Ph.D. 1991, Stanford University
- Gary M. Fiskum, Associate Professor of Biochemistry and of Emergency Medicine**  
B.A. 1973, University of California, Los Angeles; Ph.D. 1977, St. Louis University
- Kenneth S. Flamm, Adjunct Professor of Economics and International Affairs**  
B.A. 1973, Stanford University; Ph.D. 1979, Massachusetts Institute of Technology
- Larry Allen Fletcher, Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1959, Colorado State University; M.S. 1961, Massachusetts Institute of Technology
- G. Thomas Foggini, Professorial Lecturer in Geography**  
B.A. 1960, University of Virginia; M.A. 1969, University of California, Los Angeles; Ph.D. 1980, University of Montana
- Vincy Fon, Assistant Professor of Economics**  
B.A. 1971, Wisconsin State University; M.A. 1975, M.A. 1977, Ph.D. 1981, University of Kansas
- Ernest Harvey Forman, Professor of Management Science**  
B.S. 1964, University of Rochester; M.S. 1969, Johns Hopkins University; D.Sc. 1975, George Washington University
- Charles William Fotis, Professorial Lecturer in Engineering**  
B.A. 1937, M.A. 1939, Tufts University; Ph.D. 1959, American University
- David F. Fowler, Oliver T. Carr Professor; Professor of Accountancy; Dean of the School of Business and Public Management**  
B.S./B.A. 1955, University of Missouri
- Thomas B. Fowler, Associate Professorial Lecturer in Engineering**  
B.A. 1969, B.S. 1972, University of Maryland; M.S. 1973, Columbia University; D.Sc. 1986, George Washington University
- John Davidson Frame, Professor of Management Science**  
B.A. 1967, College of Wooster; M.A. 1969, Ph.D. 1976, American University
- Michael J. Francis, Assistant Professorial Lecturer in Art**  
B.F.A. 1973, The Maryland Institute, College of Art; M.F.A. 1978, George Washington University
- Calvin Charles Frantz, Associate Professorial Lecturer in Engineering**  
B.S. 1959, University of Illinois; B.S. 1969, Naval Postgraduate School; M.S. 1980, George Washington University
- Douglas C. Frechtling, Visiting Associate Professor of Travel and Tourism**  
B.A. 1965, Hamilton College; M.Phil. 1970, Ph.D. 1973, George Washington University
- Roderick Stuart French, Professor of Philosophy; Vice President for Academic Affairs**  
B.A. 1954, Kenyon College; M.Div. 1957, Episcopal Divinity School; S.T.M. 1965, Union Theological Seminary; Ph.D. 1971, George Washington University



- Maxine Benjamin Freund, Professor of Special Education**  
B.A. 1968, University of Minnesota; M.A. 1973, Ed.D. 1981, George Washington University
- Gideon Frieder, James Clark Professor of Engineering and Applied Science;  
Professor of Statistics; Dean of the School of Engineering and Applied  
Science**  
B.Sc. 1959, M.Sc. 1961, D.Sc. 1967, Technion, Israel
- Arthur Daniel Friedman, Professor of Engineering and Applied Science**  
B.A. 1961, B.S. in E.E. 1962, M.S. in E.E. 1963, Ph.D. 1965, Columbia University
- Melvin Harvey Friedman, Professorial Lecturer in Engineering**  
B.S. 1962, M.S. 1964, Ph.D. 1969, Carnegie-Mellon University; M.S. 1981, M.S. 1983, Johns  
Hopkins University
- Richard C. Fritsch, Assistant Clinical Professor of Psychology**  
B.A. 1973, Lawrence University; M.A. 1983, Ph.D. 1986, George Washington University
- Yuen-Sun Fu, Associate Professorial Lecturer in Engineering**  
B.S. 1955, Taipei Institute of Technology, Taiwan; M.S. 1959, Kansas State University; Ph.D. 1975,  
University of Kansas
- Stephen Souther Fuller, Professor of Urban and Regional Planning**  
B.A. 1962, Rutgers University; M.C.P. 1964, University of Mississippi; Ph.D. 1969, Cornell  
University
- Jesse Warren Fussell, Associate Professorial Lecturer in Engineering**  
B.S. 1964, Louisiana State University; M.S. 1972, D.Sc. 1981, George Washington University
- Mary Hatwood Futrell, Associate Professor of Education**  
B.S. 1962, Virginia State College; M.A. 1968, Ed.D. 1992, George Washington University
- Anthony R. Gallagher, Assistant Professorial Lecturer in Forensic Sciences**  
J.D. 1977, University of Baltimore
- Michael Graham Gallagher, Professor of Accountancy**  
B.A. in Govt. 1960, J.D. 1964, LL.M. 1971, George Washington University; C.P.A. 1965, State of  
Virginia
- Linda Lou Gallo, Professor of Biochemistry and Molecular Biology**  
B.S. 1959, West Virginia University; M.S. 1963, Ph.D. 1969, George Washington University
- Robert Charles Gallo, Adjunct Professor of Genetics**  
B.A. 1959, Providence College; M.D. 1963, Thomas Jefferson University
- Cayo Elizabeth Gamber, Adjunct Assistant Professor of English**  
B.A. 1979, College of William and Mary; M.Phil. 1986, Ph.D. 1991, George Washington University
- Jody Marcela Ganiban, Assistant Professor of Psychology**  
B.S. 1986, Brown University; M.A. 1989, Ph.D. 1991, University of Rochester
- Donald J. Gantzer, Associate Professorial Lecturer in Engineering**  
B.S. 1964, M.S. 1965, Ohio State University; M.A. 1979, Virginia Polytechnic Institute and State  
University
- Robert Norton Ganz, Jr., Professor of English**  
B.A. 1949, M.A. 1951, Ph.D. 1959, Harvard University
- Jorge Garcia, Assistant Professor of Human Services**  
B.S. 1977, Universidad Catolica de Chile; M.S. 1984, Dr.Rehab. 1988, Southern Illinois University  
at Carbondale
- Oscar Nicolas Garcia, Professor of Engineering and Applied Science**  
B.S. 1961, M.S. 1964, North Carolina State University; Ph.D. 1969, University of Maryland
- Phillip E. Gardner, Assistant Professorial Lecturer in Administrative  
Sciences**  
B.A. 1960, U.S. Naval Academy; M.S. 1970, Naval Postgraduate School; M.S. 1990, George  
Washington University
- Nathan Conant Garner, Associate Professor of Theatre**  
B.A. 1963, Tufts University; M.A. 1966, University of North Carolina; Ph.D. 1986, University of  
Michigan
- Kevin George Garrahan, Assistant Professorial Lecturer in Engineering**  
B.S. 1977, University of Massachusetts; M.S. 1982, George Washington University
- Carleton Theodore Garrett, Professor of Pathology and of Genetics**  
B.A. 1962, Lehigh University; M.D. 1966, Johns Hopkins University; Ph.D. 1977, University of  
Wisconsin
- Lloyd Bernard Garrett, Associate Professorial Lecturer in Engineering**  
B.S. 1962, M.S. 1968, Virginia Polytechnic Institute and State University; Ph.D. 1971, North  
Carolina State University
- Charles Alexander Garris, Professor of Engineering**  
B.E. 1965, State University of New York, Maritime College; M.S. 1968, Ph.D. 1971, State  
University of New York at Stony Brook

- Joseph Lewis Gastwirth, Professor of Statistics and Economics**  
B.S. 1958, Yale University; M.A. 1960, Princeton University; Ph.D. 1963, Columbia University
- Harry Irving Gates, Associate Professor of Sculpture**  
B.F.A. 1958, M.F.A. 1960, University of Illinois
- Jerry F. Georgatos, Associate Professorial Lecturer in Administrative Sciences**  
B.S. 1965, California State University, Hayward; M.S. 1968, Stanford University
- Rosina M. Georgiadis, Assistant Professor of Chemistry**  
B.S. 1982, Indiana University; Ph.D. 1989, University of California, Berkeley
- Christian Murray-Allen Gerhard, Adjunct Professor of Educational Leadership**  
B.S. 1944, Radcliffe College; M.A. 1952, Texas Christian University; Ed.D. 1983, George Washington University
- Carl H. Gerhold, Associate Professorial Lecturer in Engineering**  
B.S.M.E. 1970, Ohio Northern University; M.S.M.E. 1972, Ph.D. 1974, Purdue University
- Norman Gerstanzang, Professorial Lecturer in Engineering**  
B.C.E. 1947, Polytechnic University; J.D. 1967, University of Denver
- Fariborz Ghadar, Professor of International Business**  
B.S. (C.E.) 1968, B.S. 1969, M.S. (M.E.) 1970, Massachusetts Institute of Technology; M.B.A. 1972, D.B.A. 1975, Harvard University
- Ahmad Ghamarian, Associate Professorial Lecturer in Engineering**  
B.S. 1972, Arya-Mehr University of Technology, Iran; M.S. 1977, D.Sc. 1981, George Washington University
- Ali Ghovanlou, Professorial Lecturer in Physics**  
M.S. 1966, University of Mainz, Germany; Ph.D. 1971, George Washington University
- Howard Frank Gillette, Jr., Professor of American Civilization**  
B.A. 1964, Ph.D. 1970, Yale University
- Gary L. Gilliland, Adjunct Assistant Professor of Genetics**  
B.S. 1975, University of Idaho; Ph.D. 1979, Rice University
- Charles Matthew Gilmore, Professor of Engineering and Applied Science**  
B.S. 1963, M.S. 1964, Pennsylvania State University; Ph.D. 1971, University of Maryland, P.E.
- Irving Isadore Glick, Professor of Mathematics**  
B.A. 1953, Johns Hopkins University; Ph.D. 1961, University of Maryland
- Jacqueline J. Glover, Assistant Professor of Philosophy**  
B.A. 1977, University of North Carolina, Wilmington; Ph.D. 1988, Georgetown University
- Michael Stanley Gluck, Professorial Lecturer in Engineering**  
B.S. 1961, City University of New York, City College; M.S. 1963, New York University; D.Sc. 1978, George Washington University
- Peter A. Gnoffo, Assistant Professorial Lecturer in Engineering**  
B.S. 1974, Polytechnic University; M.S. 1977, George Washington University; M.A. 1980, Ph.D. 1983, Princeton University
- Desa Gobovic, Visiting Assistant Professor of Engineering and Applied Science**  
B.Sc. 1976, University of Titograd, Yugoslavia; M.S. 1985, Ph.D. 1988, George Washington University
- Mark G. Goedde, Associate Professorial Lecturer in Engineering**  
B.S. 1979, Christian Brothers College; M.B.A. 1983, George Washington University
- Walter Anthony Goetz, Professorial Lecturer in Engineering**  
B.S. (M.E.) 1960, Michigan State University; M.E.A. 1974, George Washington University
- Sidney Gold, Adjunct Instructor in English**  
B.A. 1971, M.A. 1977, State University of New York College at Brockport
- Robert Stanley Goldfarb, Professor of Economics**  
B.A. 1964, Columbia University; M.A. 1965, M.Phil. 1967, Ph.D. 1968, Yale University
- David Goldman, Adjunct Professor of Genetics and Professorial Lecturer in Biological Sciences**  
B.S. 1974, Yale University; M.D. 1978, University of Texas
- Allan L. Goldstein, Professor of Biochemistry and Molecular Biology**  
B.S. 1959, Wagner College; M.S. 1961, Ph.D. 1964, Rutgers University
- Paula G. Gomes, Assistant Clinical Professor of Psychology**  
B.A. 1980, Duke University; Psy.D. 1986, Hahnemann University
- Donald S. Good, Professorial Lecturer in Health Services Management and Policy**  
B.S. 1958, Ohio State University; M.H.A. 1964, Medical College of Virginia of Virginia Commonwealth University



- Robert Goulard, Professor of Engineering and Applied Science**  
Ph.D. 1957, Purdue University
- Lois Graff, Associate Professor of Management Science; Associate Dean of the School of Business and Public Management, for Undergraduate Programs**  
B.A. 1964, Mundelein College; M.S. 1965, Ph.D. 1969, New York University; M.B.A. 1979, University of Illinois
- Quentin Graham, Assistant Clinical Professor of Psychology**  
B.A. 1973, Brown University; Ph.D. 1983, George Washington University
- Mary J. Granger, Assistant Professor of Management Science**  
B.S. 1965, Mount Saint Vincent College; M.B.A. 1980, Ph.D. 1990, University of Cincinnati
- Jennifer M. Green, Assistant Professor of English**  
M.A. 1984, University of Edinburgh, Scotland; M.A. 1986, Ph.D. 1990, University of Pennsylvania
- Joseph Arthur Greenberg, Professor of Education**  
B.S. in Bus.Ed. 1966, Salem State College; Ed.M. 1968, Ed.D. 1974, Boston University
- Warren Greenberg, Professor of Health Economics and of Health Care Sciences**  
B.A. 1964, Temple University; M.A. 1965, University of Pennsylvania; Ph.D. 1972, Bryn Mawr College
- Arnold Greenland, Professorial Lecturer in Engineering**  
B.S. 1969, Case Western Reserve University; M.A. 1973, Ph.D. 1975, University of Rochester
- Robert Carl Gresen, Assistant Clinical Professor of Psychology**  
B.A. 1970, University of Wisconsin-Milwaukee; M.A. 1972, Ph.D. 1975, Bowling Green State University
- David Alan Grier, Assistant Professor of Statistics; Director of the University Honors Program**  
B.A. 1978, Middlebury College; M.S. 1983, Ph.D. 1986, University of Washington
- Edward Geary Griffin, Professorial Lecturer in History and International Affairs**  
B.A. 1950, Yale University; M.A. 1951, Ph.D. 1965, Columbia University
- Michael D. Griffin, Professorial Lecturer in Engineering**  
B.A. 1971, Johns Hopkins University; M.S. 1979, University of Southern California; Ph.D. 1977, University of Maryland
- Fuller Griffith, Assistant Professor of Graphics**  
B.S. 1952, University of Wisconsin; M.F.A. 1969, George Washington University
- William Byron Griffith, Professor of Philosophy**  
B.A. 1958, University of Notre Dame; M.A. 1962, Ph.D. 1963, Yale University
- Catherine Griggs, Lecturer in Anthropology**  
B.A. 1986, M.A. 1989, George Washington University
- Roy Richard Grinker, Assistant Professor of Anthropology**  
B.A. 1983, Grinnell College; M.A. 1985, Ph.D. 1989, Harvard University
- Donald Gross, Professor of Operations Research; Associate Vice President for Research and Graduate Studies**  
B.S. 1956, Carnegie-Mellon University; M.S. 1959, Ph.D. 1962, Cornell University; P.E.
- Phillip Donald Grub, Aryamehr Professor of Multinational Management**  
B.A., B.A. in Ed. 1953, Eastern Washington State College; M.B.A. 1960, D.B.A. 1964, George Washington University
- Marina Keet Grut, Lecturer in Dance**
- Donald Urban Gubser, Professorial Lecturer in Engineering**  
B.S. 1963, M.S. 1964, Ph.D. 1969, University of Illinois
- Carl F. Gudenius, Assistant Professor of Theatre**  
B.A. 1980, Providence College; M.F.A. 1983, Wayne State University
- Murli Manohar Gupta, Professor of Mathematics**  
B.S. 1963, M.S. 1965, Agra University, India; M.S. 1969, Ph.D. 1971, University of Saskatchewan, Canada
- Zsuzsanna Gyorky, Assistant Clinical Professor of Psychology**  
B.A. 1975, Ph.D. 1982, University of Minnesota
- Herman Habermann, Professorial Lecturer in Engineering**  
B.S. 1964, Pratt Institute; M.S. 1966, Adelphi University; Ph.D. 1975, University of Wisconsin
- Helmut Haberzettl, Associate Professor of Physics**  
M.Sc. 1975, Ph.D. 1979, University of Bonn, Germany
- Michel Ramzi Habib, Associate Professorial Lecturer in Engineering**  
B.Sc. 1973, Cairo University, Egypt; M.E.A. 1978, D.Sc. 1988, George Washington University

- Robert Arthur Hadley, Associate Professor of History**  
B.A. 1959, Bowdoin College; M.A. 1960, Ph.D. 1964, University of Pennsylvania
- Gordon Hager, Adjunct Associate Professor of Genetics**  
B.S. 1964, University of Kansas; Ph.D. 1970, University of Washington
- James K. Hahn, Assistant Professor of Engineering and Applied Science**  
B.S. 1979, University of South Carolina; M.S. 1981, University of California, Los Angeles; M.S. 1983, Ph.D. 1989, Ohio State University
- William Emitt Halal, Professor of Management Science**  
B.S. 1956, Purdue University; M.B.A. 1970, Ph.D. 1971, University of California, Berkeley
- John Frederick Halldane, Professorial Lecturer in Engineering**  
B.S. 1959, B.Arch. 1961, University of New Zealand; Ph.D. 1968, University of Auckland, New Zealand
- Morton Halperin, Edgar R. Baker Professor of International Affairs**  
B.A. 1958, Columbia College; M.A. 1959, Ph.D. 1961, Yale University
- William R. Hancuff, Jr., Professorial Lecturer in Engineering**  
B.S. 1966, Loyola University of Louisiana; M.S. 1968, Stanford University; Ph.D. 1972, University of Texas
- William C. Handorf, Professor of Finance**  
B.A. 1966, M.B.A. 1967, University of Michigan; Ph.D. 1973, Michigan State University
- Ruth S. Hanft, Professor of Health Services Management and Policy and of Health Care Sciences**  
B.S. 1949, Cornell University; M.A. 1963, City University of New York, Hunter College; Ph.D. 1989, George Washington University
- Michael Joseph Hanley, Assistant Professorial Lecturer in Engineering**  
B.S. 1958, U.S. Naval Academy; M.S. 1971, Naval Postgraduate School
- Barry Wellesley Hannah, Adjunct Professor of Engineering**  
B.S. 1963, M.S. 1965, Ph.D. 1973, University of Cincinnati
- Corey James Hansen, Visiting Assistant Professor of Secondary Education**  
B.A. 1978, Virginia Wesleyan College; M.S. 1983, Old Dominion University; Ed.D. 1991, George Washington University
- Jon G. Hanson, Associate Professorial Lecturer in Administrative Sciences**  
B.S. 1977, U.S. Air Force Academy; M.S. 1981, Air Force Institute of Technology; Ph.D. 1987, University of Central Florida
- Muhammad Ikramul Haque, Associate Professor of Engineering and Applied Science**  
B.Sc. 1961, Punjab University, Pakistan; B.Sc. 1965, Engineering University, Pakistan; M.S. 1970, Ph.D. 1973, Colorado State University
- Jay Charles Hardin, Professorial Lecturer in Engineering**  
B.S. 1964, M.S. 1965, Ph.D. 1969, Purdue University
- John Hardt, Adjunct Professor of Economics**  
B.A. 1945, M.A. 1948, University of Washington; M.A. 1950, Ph.D. 1955, Columbia University
- Valentina Harizanov, Assistant Professor of Mathematics**  
B.S. 1978, M.S. 1980, University of Belgrade, Yugoslavia; M.A. 1984, Ph.D. 1987, University of Wisconsin
- Michael Mont Harmon, Professor of Public Administration**  
B.A. 1963, Utah State University; M.P.A. 1966, Ph.D. 1968, University of Southern California
- Edmund Patrick Harper, Associate Professor of Physics**  
B.S. 1965, University College, Dublin; M.S. 1969, Ph.D. 1972, Purdue University
- John Richard Harrauld, Associate Professor of Engineering Management**  
B.S. 1964, U.S. Coast Guard Academy; M.A. 1969, Wesleyan University; M.S. 1978, Massachusetts Institute of Technology; M.B.A. 1972, Ph.D. 1982, Rensselaer Polytechnic Institute
- Robert Joseph Harrington, Professor of Engineering and Applied Science**  
B.S. 1962, Ph.D. 1965, University of Liverpool, England
- David Reed Harris, Professorial Lecturer in Administrative Sciences**  
B.A., B.S. 1968, Carnegie-Mellon University; M.A. 1970, Ph.D. 1977, Texas Christian University; Ph.D. 1972, Ohio State University
- Jack E. Harris, Associate Professorial Lecturer in Engineering**  
B.S. 1956, Marquette University
- Maxine Harris, Assistant Clinical Professor of Psychology**  
B.A. 1969, Wellesley College; M.A. 1971, Ph.D. 1974, Clark University
- Robert Scott Harrison, Adjunct Instructor in Exercise Science and Tourism Studies**
- Joan Francis Harrop, Associate Professorial Lecturer in Art**  
B.S. 1947, Mount Mary College; M.F.A. 1976, M.A. 1983, George Washington University



- Deborah Mary Hart, Assistant Professor of Geography and Regional Science**  
B.A. 1981, B.A. 1983, M.A. 1984, University of Witwatersrand, South Africa; Ph.D. 1990, Syracuse University
- Kim Jay Hartswick, Associate Professor of Art**  
B.A. 1973, Allegheny College; M.A. 1976, Case Western Reserve University; M.A. 1981, Ph.D. 1984, Bryn Mawr College
- Lin C. Hartung, Assistant Professorial Lecturer in Engineering**  
B.S. 1985, M.E. 1985, Rensselaer Polytechnic Institute
- Jerry Harvey, Professor of Management Science**  
B.B.A. 1957, Ph.D. 1963, University of Texas
- Lisa St. Clair Harvey, Assistant Professor of Communication**  
B.A. 1979, McGill University, Canada; M.S. 1983, Cornell University; Ph.D. 1990, University of Washington
- Muriel Hasbun, Assistant Professorial Lecturer in Art**  
B.A. 1983, Georgetown University; M.F.A. 1989, George Washington University
- Salah S. Hassan, Assistant Professor of Business Administration**  
B.S. 1975, King Saud University, Saudi Arabia; M.S. 1977, Oklahoma State University; Ph.D. 1984, Ohio State University
- Franz Hatfield, Associate Professorial Lecturer in Engineering**  
B.A. 1972, University of California; M.B.A. 1976, Temple University; M.S. 1980, Ph.D. 1982, University of Pennsylvania
- Charles R. Hauer, Professorial Lecturer in Engineering**  
B.Ch.E. 1951, M.S.Ch.E. 1959, Pratt Institute
- Oli Havrylyshyn, Professor of Economics and International Affairs**  
B.A. 1966, Queen's University, Canada; Ph.D. 1972, Massachusetts Institute of Technology
- Donald E. Hawkins, Professor of Tourism Studies and Research Professor of Medicine**  
B.A. 1958, King's College, Pennsylvania; M.A. 1960, Lehigh University; Ed.D. 1967, New York University
- V. Robert Hayles, Associate Professorial Lecturer in Engineering**  
B.A. 1970, M.A. 1972, University of Kansas; Ph.D. 1974, University of Colorado
- Janet Craig Heddesheimer, Professor of Counseling and Research Professor of Psychiatry and Behavioral Sciences; Associate Dean of the School of Education and Human Development**  
B.A. 1965, Coe College; M.A. 1968, Ph.D. 1971, Ohio State University
- Hermann Josef Helgert, Professor of Engineering and Applied Science**  
B.S. 1962, M.S. 1964, Ph.D. 1966, State University of New York at Buffalo
- Rachelle Silverman Heller, Associate Professor of Engineering and Applied Science**  
B.S. 1964, State University of New York at Stony Brook; M.S. 1972, Ph.D. 1986, University of Maryland
- Fredric Neil Hellman, Associate Professorial Lecturer in Forensic Sciences**  
M.D. 1985, Eastern Virginia Medical School
- William Price Henderson, Associate Professorial Lecturer in Engineering**  
B.S. 1958, University of Georgia; M.E.A. 1985, George Washington University
- Jeffrey Roger Henig, Professor of Political Science**  
B.A. 1973, Cornell University; Ph.D. 1977, Northwestern University
- Charles Joseph Herber, Associate Professor of European History**  
B.A. 1952, Dickinson College; M.A. 1957, Ph.D. 1965, University of California, Berkeley
- Robert Alexander Herring, Jr., Professorial Lecturer in Engineering**  
B.S. 1938, M.S. 1938, Georgetown University
- Susan Hertz, Professorial Lecturer in Anthropology**  
B.A. 1968, Stanford University; M.A. 1969, Ph.D. 1974, University of Minnesota
- Florence E. Hesser, Professor of Education**  
B.A. 1963, Purdue University; M.A. 1965, University of Missouri; Ed.D. 1974, Ball State University
- John G. Hibbits, Adjunct Professor of International Affairs**  
B.S. 1962, Fordham University; M.A. 1972, Georgetown University
- George E. Hicho, Assistant Professorial Lecturer in Engineering**  
B.S. 1960, University of Pittsburgh; M.S. 1977, George Washington University
- Joan L. Hilderbrandt, Instructor in Chemistry**  
B.S. 1963, Pennsylvania State University
- Peter Proal Hill, Professor of History and International Affairs**  
B.A. 1949, Tufts University; M.A. 1954, Boston University; Ph.D. 1966, George Washington University

- James William Hillis, Professor of Speech and Hearing**  
B.S. 1952, University of Nebraska; M.A. 1957, University of Maryland; Ph.D. 1963, Ohio State University
- Joseph Hilmy, Professor of Accountancy**  
B.Com. 1947, M.S. 1954, Ph.D. 1959, University of Aberdeen, Scotland
- Alfred John Hildebeitel, Professor of Religion**  
B.A. 1963, Haverford College; M.A. 1966, Ph.D. 1973, University of Chicago
- Denis Michael Hitchcock, Associate Professor of Art**  
B.A. 1967, University of California, Los Angeles; M.F.A. 1970, Ph.D. 1977, Princeton University
- Timothy T. Hla, Adjunct Assistant Professor of Genetics**  
M.B., B.S. 1981, Institute of Medicine, Burma; B.S. 1983, Western Illinois University; Ph.D. 1988, George Washington University
- Carol Hren Hoare, Professor of Human Services**  
B.S. 1962, Carlow College; M.S. 1964, University of North Carolina; Ed.D. 1980, George Washington University
- Herman Hedberg Hobbs, Professor of Physics**  
B.S. 1953, M.S. 1955, George Washington University; Ph.D. 1958, University of Virginia
- Kevin G. Hockett, Assistant Professor of Mathematics**  
B.S. 1979, Illinois State University; Ph.D. 1986, Cornell University
- Lance Joel Hoffman, Professor of Engineering and Applied Science**  
B.S. 1964, Carnegie-Mellon University; M.S. 1967, Ph.D. 1970, Stanford University
- Richard D. Hofler, Associate Professorial Lecturer in Engineering**  
B.S. 1962, University of North Carolina; M.E.A. 1985, George Washington University
- Richard Frank Hoglund, Professorial Lecturer in Engineering**  
B.S. 1954, M.S. 1955, Ph.D. 1960, Northwestern University
- R. Michael Holland, Assistant Professorial Lecturer in Engineering**  
B.S. 1974, Florida Institute of Technology; M.A. 1982, Central Michigan University
- Mary Alida Holman, Professor of Economics**  
B.A. 1955, M.A. 1957, Ph.D. 1963, George Washington University
- Dennis Howard Holmes, Professor of Education**  
B.A. 1962, California State University, San Jose; M.A. 1971, Wayne State University; Ed.D. 1978, University of Southern California
- Dorothy Evans Holmes, Clinical Professor of Psychology**  
B.S. 1963, University of Illinois; M.A. 1966, Ph.D. 1968, Southern Illinois University
- Robert William Holmstrom, Associate Professor of Psychology**  
B.A. 1956, Trinity College, Connecticut; Ph.D. 1965, Duke University
- Gloria Lyon Horrorth, Professor of Education**  
B.A. 1952, California State University, Los Angeles; M.A. 1961, California State University, Northridge; Ed.D. 1972, American University
- James O. Horton, Professor of American History and Civilization**  
B.A. 1964, State University of New York at Buffalo; M.A. 1970, University of Hawaii; Ph.D. 1973, Brandeis University
- Alexander Hoshovsky, Professorial Lecturer in Engineering**  
B.A. 1952, Saint Mary's University of San Antonio; M.A. 1963, George Washington University; Ph.D. 1973, American University
- Bruce H. Howard, Adjunct Associate Professor of Genetics**  
B.A. 1968, Harvard University; M.D. 1972, University of California, San Francisco
- Edmund G. Howe, Professorial Lecturer in Forensic Sciences**  
B.A. 1966, Yale University; M.D. 1970, Columbia University; J.D. 1976, Catholic University of America
- Leon W. Hoyer, Adjunct Professor of Genetics**  
B.A. 1958, Harvard University; M.D. 1962, University of Minnesota
- John Chang-Cheng Hsing, Associate Professorial Lecturer in Engineering**  
B.S.E.E. 1967, National Taiwan University; M.S.E.E. 1970, Ph.D. 1974, University of Massachusetts
- Valerie Wailin Hu, Associate Professor of Biochemistry and Molecular Biology and of Genetics**  
B.S. 1972, University of Hawaii; Ph.D. 1978, California Institute of Technology
- Sen Huang, Assistant Research Professor of Anatomy**  
M.S. 1982, Ph.D. 1988, Shanghai Brain Research Institute, China
- Brian E. Huber, Assistant Professorial Lecturer in Pharmacology**  
B.S.G. 1976, M.S. 1979, Villanova University; Ph.D. 1983, George Washington University
- Terry Lee Hufford, Professor of Botany**  
B.S. 1961, M.A. 1962, Bowling Green State University; Ph.D. 1972, Ohio State University
- Marcel B. Humber, Visiting Assistant Professor of Finance**  
B.S. 1951, Wake Forest College; M.B.A. 1978, Ph.D. 1990, George Washington University



- Robert Lee Humphrey, Jr., Professor of Anthropology**  
B.A. 1962, American University; Ph.D. 1970, University of New Mexico
- Hing-Loi A. Hung, Adjunct Professor of Engineering**  
B.S. 1968, Massachusetts Institute of Technology; M.S. 1970, Ph.D. 1974, Cornell University
- Harriet S. Hunter-Boykin, Assistant Professor of Secondary Education**  
B.S. 1972, Norfolk State University; M.A. 1976, University of the District of Columbia; Ed.D. 1983, George Washington University
- Catherine Hurley, Assistant Professor of Statistics**  
B.Sc. 1982, University College, Ireland; M.S. 1984, Ph.D. 1987, University of Washington
- Timothy Ray Husson, Assistant Professorial Lecturer in Engineering**  
B.E.(E.E.) 1976, Manhattan College
- Robert Nicholas Ianacone, Professor of Special Education; Associate Dean of the School of Education and Human Development**  
B.S. 1968, M.S. 1971, State University of New York at Buffalo; Ed.D. 1976, University of Florida
- Mohammed Ashraf Imam, Adjunct Associate Professor of Engineering**  
B.S. 1965, Regional Institute of Technology, Ranchi University, India; M.S. 1972, Carnegie-Mellon University; D.Sc. 1978, George Washington University
- John Frederic Ince, Professorial Lecturer in Engineering**  
B.S. 1966, Webb Institute of Naval Architecture; M.S. 1968, Massachusetts Institute of Technology; M.S. 1972, D.Sc. 1978, George Washington University
- Donna Lind Infeld, Professor of Health Services Management and Policy and of Health Care Sciences**  
B.S. 1971, Portland State University; Ph.D. 1978, Brandeis University
- Charles Gabriel Interrante, Professorial Lecturer in Engineering**  
B.S. 1959, M.S. 1962, Ph.D. 1963, Lehigh University
- Telba Zalkind Irony, Assistant Professor of Operations Research**  
B.S. 1980, M.S. 1984, University of Sao Paulo, Brazil; M.S. 1987, Ph.D. 1990, University of California, Berkeley
- Rita Klein Ives, Professor of Special Education**  
B.S. 1953, University of Pittsburgh; M.A. in Ed. 1957, Ed.S. 1967, Ed.D. 1971, George Washington University
- David Iwamoto, Adjunct Professor of Education**  
B.A. 1947, Walla Walla College; M.A. 1948, Columbia Union College; M.A. in Ed. 1952, Ed.D. 1963, George Washington University
- Geryes Moussa Jabbour, Assistant Professor of Finance**  
License 1973, 1979, Lebanese University, Lebanon; M.B.A. 1983, George Washington University
- William D. Jackson, Adjunct Professor of Engineering**  
B.Sc. 1947, Ph.D. 1960, Glasgow University, Scotland; A.R.C.S.T. 1948, University of Strathclyde, Scotland
- Thomas O. Jacobs, Professorial Lecturer in Administrative Sciences**  
B.A. 1950, M.A. 1954, Vanderbilt University; Ph.D. 1956, University of Pittsburgh
- Linda Jacobs-Condit, Clinical Instructor in Speech and Hearing**  
B.A. 1976, M.S. 1978, Tulane University
- Leslie Bravman Jacobson, Associate Professor of Theatre**  
B.S. 1970, Northwestern University; M.F.A. 1974, Boston University
- Steven Mark Janssen, Assistant Professorial Lecturer in Engineering**  
B.A. 1980, University of Virginia; M.S. 1987, George Washington University
- Marian Hill Jarrett, Adjunct Assistant Professor of Special Education**  
B.S. 1966, West Virginia University; M.A. 1967, Northwestern University; Ed.D. 1985, George Washington University
- Mary L. Jasnoski, Assistant Professor of Psychology**  
B.A. 1977, M.A. 1980, Ph.D. 1983, University of Kansas
- Michael David Jasnow, Assistant Clinical Professor of Psychology**  
B.A. 1973, Clark University; M.A. 1977, New York University; Ph.D. 1983, George Washington University
- Robert Lee Jenkins, Associate Clinical Professor of Psychology**  
B.A. 1972, University of Maryland; M.A. 1974, Loyola College; Ph.D. 1979, University of Oklahoma
- Diana E. Jensen, Associate Clinical Professor of Psychology**  
B.A. 1961, University of North Carolina at Greensboro; Ph.D. 1966, Indiana University
- Diana Entwisle Johnson, Associate Professor of Biology and of Genetics**  
B.A. 1970, Cornell College; Ph.D. 1975, University of Chicago
- Edgar M. Johnson, Professorial Lecturer in Administrative Sciences**  
B.S. 1964, Georgia Institute of Technology; M.S. 1967, Ph.D. 1969, Tufts University

- Kurt Edward Johnson, Professor of Anatomy**  
B.S. 1965, Johns Hopkins University; M.Phil. 1969, Ph.D. 1970, Yale University
- Martin Reid Johnson, Assistant Professor of Chemistry**  
B.A. 1982, Reed College; Ph.D. 1989, University of Texas
- Nancy Diers Johnson, Associate Professor of Dance**  
B.S. 1955, University of Minnesota; M.A. 1966, University of Iowa; Ed.D. 1980, University of North Carolina at Greensboro
- Stuart E. Johnson, Associate Professorial Lecturer in International Affairs and Political Science**  
B.A. 1966, Amherst College; Ph.D. 1971, Massachusetts Institute of Technology
- William Reid Johnson, Associate Professor of History and International Affairs**  
B.A. 1951, Oberlin College; M.A. 1955, Ph.D. 1961, University of Washington
- Douglas Linwood Jones, Professor of Engineering**  
B.M.E. 1963, M.S.E. 1965, D.Sc. 1970, George Washington University; P.E.
- Kay Howard Jones, Professorial Lecturer in Engineering**  
B.S. 1956, University of Washington; M.S. 1961, Ph.D. 1968, University of California, Berkeley
- Rembert Fred Jones, Jr., Associate Professorial Lecturer in Engineering**  
B.S. 1958, University of Maryland; M.C.E. 1964, Ph.D. 1973, Catholic University of America
- Edward J. Jordan, Jr., Associate Clinical Professor of Psychology**  
B.A. 1953, Yale University; Ph.D. 1958, Clark University
- Jeffrey H. Joseph, Professorial Lecturer in Business Administration**  
B.A. 1966, George Washington University; J.D. 1973, University of Baltimore; M.A. 1974, University of Pennsylvania
- Sumit Joshi, Assistant Professor of Economics**  
B.A. 1984, Delhi University, India; M.A. 1986, Delhi School of Economics, India; Ph.D. 1991, Indiana University
- Suresh M. Joshi, Associate Professorial Lecturer in Engineering**  
B.S. 1967, Banaras Hindu University, India; M.Tech. 1969, Indian Institute of Technology; Ph.D. 1973, Rensselaer Polytechnic Institute
- Eva Scheyer Jospe, Associate Professorial Lecturer in Religion**  
M.A. 1963, Georgetown University
- Frederick L. Joutz, Assistant Professor of Economics**  
B.A. 1979, University of Maryland; M.A. 1982, University of British Columbia, Canada; Ph.D. 1987, University of Washington
- Christopher Clayton Joyner, Professor of Political Science**  
B.A. 1970, M.A. 1972, M.A. 1973, Florida State University; Ph.D. 1977, University of Virginia
- Jer-Nan Juang, Professorial Lecturer in Engineering**  
B.S. 1969, Cheng Kung University, Taiwan; M.S. 1971, Tennessee Technological University; Ph.D. 1974, Virginia Polytechnic Institute and State University
- Hugo Dietrich Junghenn, Professor of Mathematics**  
B.S. 1964, Albright College; M.A. 1967, Villanova University; Ph.D. 1971, George Washington University
- Robert Konrad Kahn, Professorial Lecturer in Psychology**  
B.A. 1946, University of Pennsylvania; M.A. 1953, George Washington University; Ph.D. 1957, Pennsylvania State University
- Walter Kurt Kahn, Professor of Engineering and Applied Science**  
B.E.E. 1951, Cooper Union; M.E.E. 1954, D.E.E. 1960, Polytechnic University
- Michael Kaiser, Assistant Clinical Professor of Psychology**  
B.A. 1977, Franklin and Marshall College; Ph.D. 1987, George Washington University
- Apostolos Konstantinos Kakaes, Assistant Professor of Engineering and Applied Science**  
B.S. 1976, M.S. 1977, University of Colorado; Ph.D. 1967, Polytechnic University
- Daniel R. Kane, Assistant Professor of Business Administration**  
B.S. 1953, George Washington University; B.S.F.S. 1954, J.D. 1956, LL.M. 1964, Georgetown University
- Nick Kaplan, Associate Professorial Lecturer in Engineering**  
B.S.M.E. 1973, University of Missouri; M.E.A. 1985, George Washington University
- Stephen Arnold Karp, Professor of Psychology**  
B.A. 1949, City University of New York, Brooklyn College; M.A. 1952, New School for Social Research; Ph.D. 1962, New York University
- Jill Felice Kasle, Associate Professor of Public Administration; University Marshal**  
B.S. 1968, M.S. 1969, Northwestern University; J.D. 1972, Boston University



- Irving Jack Katz, Professor of Mathematics**  
B.S. 1956, City University of New York, Brooklyn College; M.A. 1958, Ohio State University; Ph.D. 1964, University of Maryland
- Judith G. Kauffman, Associate Professorial Lecturer in Art**  
B.F.A. 1968, Cornell University; M.F.A. 1981, Antioch University
- Roger Emanuel Kaufman, Professor of Engineering**  
B.S. 1962, Tufts University; M.F.A. 1965, Yale University; M.E. 1968, Ph.D. 1969, Rensselaer Polytechnic Institute; P.E.
- James Edwin Kee, Professor of Public Administration**  
B.A. 1966, University of Notre Dame; J.D. 1969, M.P.A. 1977, New York University
- Alexandria Lee Keeble, Clinical Instructor in Art Therapy**  
B.F.A. 1983, University of Georgia; M.A. 1985, George Washington University
- Azer Kehnemui, Professorial Lecturer in Engineering**  
B.S. 1962, Robert College, Turkey; M.S. 1963, University of Illinois; D.Sc. 1975, George Washington University
- Joanne Keene Kelleher, Associate Research Professor of Physiology**  
B.S. 1969, St. Louis University; M.A. 1972, Ph.D. 1976, Boston University
- Eugene Walter Kelly, Jr., Professor of Counseling and Human Services**  
B.A. 1958, M.Div. 1962, Josephinum College; M.Ed. 1969, Ph.D. 1971, University of South Carolina
- Thomas William Kelly, Adjunct Professor of Engineering**  
B.S. 1956, Temple University
- Katherine Ash Kennedy, Professor of Pharmacology and of Genetics**  
B.A. 1973, Vanderbilt University; Ph.D. 1977, University of Iowa
- Robert Emmet Kennedy, Jr., Professor of European History**  
B.A. 1963, Johns Hopkins University; M.A. 1965, Boston College; Ph.D. 1973, Brandeis University
- Stephen Gabriel Kent, Associate Professor of Pathology**  
B.A. 1956, M.D. 1960, Case Western Reserve University
- Norayr Krikor Khatcheressian, Associate Professor of Physics; Associate Dean of Columbian College and Graduate School of Arts and Sciences**  
B.A. 1960, M.A. 1963, George Washington University; Ph.D. 1966, University of Virginia
- Ram K. Khatri, Professorial Lecturer in Engineering**  
B.S. 1952, Agra University, India; B.E. 1956, Sagar University; M.S. 1961, Lehigh University; Ph.D. 1971, University of Maryland
- Dina Rizk Khoury, Assistant Professor of History**  
B.A. 1977, University of California, Riverside; M.A. 1980, Ph.D. 1987, Georgetown University
- Khalilollah Khozeimeh, Associate Professorial Lecturer in Engineering**  
B.C.E. 1965, M.S. 1967, D.Sc. 1974, George Washington University
- Gershon Kievai, Associate Professorial Lecturer in International Affairs and Political Science**  
B.A. 1975, Harvard University; M.A. 1977, Ph.D. 1980, Johns Hopkins University
- Young C. Kim, Professor of Political Science and International Affairs**  
M.A. 1956, Vanderbilt University; Ph.D. 1958, University of Pennsylvania
- H. Steven Kimmel, Professorial Lecturer in Engineering**  
B.S. 1968, University of Maryland; M.E. 1972, D.Sc. 1983, George Washington University
- Randall L. Kincaid, Adjunct Associate Professor of Genetics**  
B.S. 1972, Ph.D. 1977, Stanford University
- Phyllis Dawn Kind, Professor of Microbiology and Immunology and of Genetics**  
B.A. 1955, Montana State University; M.S. 1956, Ph.D. 1960, University of Michigan
- Michael King, Professor of Chemistry**  
B.S. 1966, Illinois Institute of Technology; M.A. 1967, Ph.D. 1970, Harvard University
- David T. Kingsbury, Professor of Microbiology and Immunology**  
B.S. 1962, M.S. 1965, University of Washington; Ph.D. 1971, University of California, San Diego
- Ali Muhlis Kiper, Professor of Engineering**  
M.S. in M.E. 1950, Technical University of Istanbul, Turkey; M.S. in M.E. 1954, Ph.D. 1956, Purdue University; P.E.
- Sheila Nataraj Kirby, Professorial Lecturer in Economics**  
B.A. 1965, Loreto Convent College, India; M.A. 1970, University of Michigan; M.Phil. 1980, Ph.D. 1983, George Washington University
- Nancy J. Kirkendall, Professorial Lecturer in Statistics**  
B.S. 1965, M.S. 1967, Ohio State University; Ph.D. 1974, George Washington University
- Arthur David Kirsch, Professor of Statistics and of Psychology**  
B.A. 1955, George Washington University; M.S. 1956, Ph.D. 1957, Purdue University

- Zeev Kitov, Associate Research Professor of Engineering and Applied Science**  
M.S. 1959, Ph.D. 1968, Moscow Institute of Communication Engineers, Russia
- Arjo Klamer, Associate Professor of Economics**  
Ph.D. 1981, Duke University
- Peter Flindell Klarén, Professor of History and International Affairs**  
B.A. 1960, Dartmouth College; M.A. 1964, Ph.D. 1968, University of California, Los Angeles
- Vladislav Klein, Professor of Engineering**  
Mech. Engr. 1954, Technical University, Czechoslovakia; Ph.D. 1974, Cranfield Institute of Technology, England
- Mark S. Klock, Associate Professor of Finance**  
B.A. 1978, Pennsylvania State University; Ph.D. 1983, Boston College; J.D. 1988, University of Maryland
- Philip Klubes, Professor of Pharmacology**  
B.S. 1956, City University of New York, Queens College; M.S. 1959, Ph.D. 1962, University of Minnesota
- Charles Eugene Knadler, Jr., Associate Professorial Lecturer in Engineering**  
B.E.S. 1965, Johns Hopkins University; M.S. 1983, D.Sc. 1989, George Washington University
- Joseph Alexander Knight, Professorial Lecturer in Engineering**  
B.S.(E.E.) 1963, Virginia Polytechnic Institute and State University; M.S.(E.E.) 1965, Ph.D. 1968, Georgia Institute of Technology
- Robert Earle Knowlton, Associate Professor of Biology**  
B.A. 1960, Bowdoin College; Ph.D. 1970, University of North Carolina
- Stephen Jeffery Koch, Assistant Professorial Lecturer in Engineering**  
B.S. 1967, Memphis State University
- Carol Anne Kochhar, Assistant Professor of Special Education**  
B.A. 1975, University of Maryland; M.A. 1981, Ed.D. 1987, George Washington University
- Marilyn Jean Koering, Professor of Anatomy**  
B.A. 1960, College of St. Scholastica; M.S. 1963, Ph.D. 1967, University of Wisconsin
- Richard William Kopka, Professorial Lecturer in Engineering**  
B.S.E.E. 1961, M.S.E.E. 1966, University of Pittsburgh
- Can Edip Korman, Assistant Professor of Engineering and Applied Science**  
B.S. 1985, M.S. 1987, Ph.D. 1990, University of Maryland
- Stavroula Kostaki-Gailey, Adjunct Assistant Professor of Teacher Education**  
B.A. 1967, University of North Carolina at Asheville, M.A. 1971, Western Carolina University, Ed.D. 1978, University of North Carolina at Greensboro
- Joseph Daniel Kotulski, Assistant Professorial Lecturer in Engineering**  
B.S. 1975, M.S. 1977, University of Illinois at Chicago Circle
- Gerald Joseph Kowalski, Adjunct Professor of Engineering**  
B.S. 1968, Marshall University; M.S. 1970, University of Arkansas, D.Sc. 1983, George Washington University
- Bruce Michael Kramer, Professor of Engineering and Applied Science**  
B.S./M.S. 1972, Ph.D. 1979, Massachusetts Institute of Technology
- Edith Kramer, Adjunct Associate Professor of Art Therapy**
- Joseph Henry Kravitz, Associate Professorial Lecturer in Geology**  
B.S. 1957, Syracuse University; M.S. 1975, M.Phil. 1977, Ph.D. 1983, George Washington University
- Ada M. Kruisbeek, Adjunct Professor of Genetics**  
B.S. 1969, Leiden University, The Netherlands; Ph.D. 1978, Utrecht University, The Netherlands
- Ruth Marilyn Krulfeld, Professor of Anthropology**  
B.A. 1956, Brandeis University; Ph.D. 1974, Yale University
- Janette Marilyn Krum, Assistant Research Professor of Anatomy**  
B.S. 1977, Cornell University; Ph.D. 1987, George Washington University
- John F. Kuehls, Associate Professorial Lecturer in Engineering**  
B.S. 1982, M.S. 1983, University of Akron; Ph.D. 1988, University of Maryland
- Joel Corneal Kuipers, Associate Professor of Anthropology**  
B.A. 1976, Calvin College; M.Phil. 1978, Ph.D. 1982, Yale University
- Gary Bruce Kulik, Associate Professorial Lecturer in American Civilization**  
B.A. 1967, St. Michael's College; Ph.D. 1980, Brown University
- Joseph H. Kullback, Professorial Lecturer in Statistics**  
B.A. 1955, George Washington University; M.S. 1957, Ph.D. 1961, Stanford University
- Ajit Kumar, Professor of Biochemistry and Molecular Biology and of Genetics**  
Ph.D. 1968, University of Chicago



- Krishna R. Kumar, Assistant Professor of Accountancy**  
B.S. 1974, Indian Institute of Technology, India, M.B.A. 1976, Indian Institute of Management, India; Ph.D. 1988, Columbia University
- Tamami Kusuda, Professorial Lecturer in Engineering**  
B.S. 1947, Tokyo University, Japan; Ph.D. 1955, University of Minnesota
- Bruce L. Kutnick, Associate Professorial Lecturer in Administrative Sciences**  
B.S. 1967, Wayne State University; Ph.D. 1984, Massachusetts Institute of Technology
- John E. Kwoka, Jr., Professor of Economics**  
B.A. 1967, Brown University; Ph.D. 1971, University of Pennsylvania
- Nicholas Kyriakopoulos, Professor of Engineering**  
B.E.E. 1960, M.S. in Engr. 1963, D.Sc. 1968, George Washington University
- John Marion Lachin III, Professor of Statistics; Director of the Biostatistics Center**  
B.S. 1965, Tulane University of Louisiana; Sc.D. 1972, University of Pittsburgh
- Melvin Paul Lader, Professor of Art**  
B.A. 1969, M.A. 1973, State University of New York at Albany; Ph.D. 1981, University of Delaware
- Marcel Chotkowski LaFollette, Associate Research Professor of Science and Technology Policy**  
B.S. 1967, University of Arkansas; M.S. 1968, Boston University; Ph.D. 1979, Indiana University
- William Norman LaForge, Professorial Lecturer in Business Administration**  
B.A. 1972, Delta State University; J.D. 1975, University of Mississippi; LL.M. 1982, Georgetown University
- Jerry Lee Lake, Professor of Photography**  
B.F.A. 1966, Virginia Commonwealth University; M.F.A. 1968, Ohio University
- Peter S. Lam, Professorial Lecturer in Engineering**  
B.S. 1967, Oregon State University; M.S. 1968, Ph.D. 1971, Stanford University
- Paul A. Lamb, Associate Professorial Lecturer in Engineering**  
B.S.(E.E.) 1960, University of Arizona; M.B.A. 1973, University of California, Los Angeles; D.Sc. 1982, George Washington University
- Kuang-Kuo Gordon Lan, Professor of Statistics**  
B.S. 1966, M.S. 1968, Taiwan University; M.A. 1971, Ph.D. 1974, Columbia University
- Judith A. Landau, Adjunct Instructor in Education**  
B.A. 1962, City University of New York; M.A.T. 1965, George Washington University
- Roger Henry Lang, Professor of Engineering and Applied Science**  
B.S.E.E. 1962, M.S.E.E. 1964, Ph.D. 1968, Polytechnic University
- Phyllis Ann Langton, Professor of Sociology**  
B.A. 1961, M.A. 1962, California State University, Los Angeles; Ph.D. 1968, University of California, Los Angeles
- Nicholas Lappas, Associate Professor of Forensic Sciences**  
B.A. 1964, Thiel College; M.S. 1973, Ph.D. 1975, Duquesne University
- James F. Larner, Assistant Professorial Lecturer in Forensic Sciences**  
B.S. 1974, State University of New York at Buffalo; M.S. 1980, University of Connecticut
- William Stone Lassiter, Associate Professorial Lecturer in Engineering**  
B.S. 1961, Ph.D. 1971, North Carolina State University; M.S. 1968, M.B.A. 1973, College of William and Mary
- Patricia Suzanne Latham, Assistant Professor of Pathology and of Genetics**  
B.S. 1968, Simmons College; M.D. 1972, University of Southern California
- Geza Peter Lauter, Professor of International Business**  
B.A. 1954, Institute for Foreign Languages, Hungary; B.A. 1962, M.B.A. 1964, Ph.D. 1968, University of California, Los Angeles
- Robert Alan Lavine, Associate Professor of Physiology and of Neurology**  
B.S. 1962, Ph.D. 1969, University of Chicago
- George Robert Lawrence, Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1964, Widener College; M.S. 1973, Engr. 1978, George Washington University
- Robert Edward Lawrence, Associate Professorial Lecturer in Engineering**  
B.S. in E.E. 1968, M.S. 1969, Ph.D. 1972, Rensselaer Polytechnic Institute
- Edward Pitt Lawson, Assistant Professorial Lecturer in Art**  
B.A. 1951, Bowdoin College; M.A. 1955, New York University
- An Thanh Le, Professorial Lecturer in Engineering**  
B.S.(E.E.) 1976, M.S. 1978, George Washington University
- William Matthew Leach, Adjunct Professor of Genetics**  
B.A. 1956, Berea College; M.S. 1962, Ph.D. 1965, University of Tennessee, Knoxville

- Gerard Paul Learmonth, Jr., Associate Professor of Administrative Sciences**  
B.S. 1966, M.B.A. 1972, New York University; M.S. 1976, Naval Postgraduate School; Ph.D. 1983, University of Michigan
- James H. Lebovic, Associate Professor of Political Science**  
B.A. 1973, California State University, Long Beach; M.A. 1975, Ph.D. 1981, University of Southern California
- Pamela Jeanne Leconte, Adjunct Instructor in Special Education**  
B.A. 1968, Millersville University of Pennsylvania; M.A. 1981, Loyola College
- Edward L. Lee II, Assistant Professorial Lecturer in Forensic Sciences**  
B.S. 1971, M.S. 1973, American University
- James Der-Yi Lee, Professor of Engineering and Applied Science**  
B.S. 1964, National Taiwan University; M.S. 1967, Rice University; Ph.D. 1971, Princeton University
- Myrna Pike Lee, Associate Professor of Mathematics**  
B.A. 1957, Cornell University; M.S. 1959, Ph.D. 1962, University of Illinois
- Robert Lee, Assistant Professorial Lecturer in Engineering**  
B.S. 1972, George Washington University
- Ting N. Lee, Professor of Engineering and Applied Science**  
B.S.E.E. 1962, Cheng Kung University, Taiwan; M.S.E.E. 1965, Illinois Institute of Technology; Ph.D. 1972, University of Wisconsin
- Donald Richard Lehman, Professor of Physics**  
B.A. 1962, Rutgers University; M.S. 1964, Air Force Institute of Technology; Ph.D. 1970, George Washington University
- Lawrence Martin Leibowitz, Professorial Lecturer in Engineering**  
B.S. 1960, M.S. 1964, New York University; D.Sc. 1978, George Washington University
- Eugene Barry Leiderman, Associate Professorial Lecturer in Engineering**  
B.A. 1965, M.L.S. 1967, University of Maryland; M.S. 1970, Ohio State University
- Stephen B. Leighton, Associate Professorial Lecturer in Engineering**  
B.S. 1968, Yale University; M.S. 1969, D.Sc. 1976, Massachusetts Institute of Technology
- Patricia Hilary Madoo Lengermann, Professor of Sociology**  
B.A. 1963, Oxford University; M.A. 1966, Ph.D. 1969, Cornell University
- D. Jeffrey Lenn, Associate Professor of Business Administration**  
B.S. 1962, University of Pennsylvania; M.Div. 1966, Andover Newton Theological School; M.S. 1969, Yale University; Ph.D. 1981, Boston College
- Richard M. Lenoir, Assistant Professor of Strategic Management**  
B.B.A. 1971, Texas A&M University; M.B.A. 1973, University of Texas; D.B.A. 1987, University of Colorado
- David R. Levin, Professorial Lecturer in Engineering**  
B.A. 1934, M.A. 1935, Ph.D. 1937, University of Wisconsin
- Bernard Thomas Lewis, Professorial Lecturer in Engineering**  
B.S. 1943, U.S. Military Academy; M.A. 1950, Columbia University; D.Sc. 1979, Pacific University
- John Frederick Lewis, Professor of Geology**  
B.S. 1959, M.S. 1960, Victoria University, New Zealand; D.Phil. 1964, Oxford University
- Martin W. Lewis, Assistant Professor of Geography and Regional Science**  
B.A. 1979, University of California, Santa Cruz; M.A. 1975, Ph.D. 1987, University of California, Berkeley
- William H. Lewis, Professor of Political Science and International Affairs**  
B.A. 1951, M.A. 1953, George Washington University; Ph.D. 1960, American University
- Harold Liebowitz, L. Stanley Crane Professor of Engineering and Applied Science**  
B.Ae.E. 1944, M.Ae.E. 1946, D.Ae.E. 1948, Polytechnic University; P.E.
- Jay Liebowitz, Professor of Management Science**  
B.B.A. 1979, M.B.A. 1980, D.Sc. 1985, George Washington University
- Marilyn Louise Liebrez-Himes, Associate Professor of Business Administration**  
B.A. 1966, Wheaton College; M.A. 1973, Ph.D. 1980, Michigan State University
- Hubert Whitman Lilliefors, Professor of Statistics**  
B.A. 1952, Ph.D. 1964, George Washington University; M.A. 1953, Michigan State University
- Carl Arne Linden, Professor of Political Science and International Affairs**  
B.A. 1951, Syracuse University; M.A. 1956, Harvard University; Ph.D. 1966, George Washington University
- Roy Charles Lindholm, Professor of Geology**  
B.S. 1959, University of Michigan; M.A. 1963, University of Texas; Ph.D. 1967, Johns Hopkins University



- Craig William Linebaugh, Professor of Speech and Hearing and Research Professor of Medicine**  
B.A. 1970, Lebanon Valley College; M.A. 1974, Ph.D. 1975, Temple University
- Donald C. Linkowski, Professor of Counseling and Research Professor of Psychiatry and Behavioral Sciences**  
B.A. 1961, M.S. 1963, Ph.D. 1969, State University of New York at Buffalo
- Joel Arthur Lipkin, Associate Professorial Lecturer in Engineering**  
B.A. 1974, George Washington University; M.A. 1977, Ph.D. 1979, Catholic University of America
- Diana Leigh Lipscomb, Associate Professor of Biology**  
B.A. 1976, Agnes Scott College; Ph.D. 1982, University of Maryland
- John D. Liveris, Professorial Lecturer in Engineering**  
B.S.M.E. 1974, Tufts University; M.E.A. 1976, George Washington University
- Steven L. Livingston, Assistant Professor of Political Communication**  
B.A. 1981, University of South Florida; M.A. 1984, Ph.D. 1990, University of Washington
- John Lobuts, Jr., Professor of Management Science**  
B.S. 1957, Fairmont State College; M.A. in Ed. 1965, Ed.D. 1970, George Washington University
- Murray Howard Loew, Professor of Engineering and Applied Science**  
B.S.E.E. 1965, Drexel University; M.S.E.E. 1967, Ph.D. 1972, Purdue University; P.E.
- John Mortimer Logsdon, Professor of Political Science and International Affairs**  
B.S. 1960, Xavier University, Ohio; Ph.D. 1970, New York University
- Rainald Löhner, Associate Research Professor of Engineering and Applied Science**  
M.Sc. 1982, Technical University of Brunswick, Germany; Ph.D. 1984, University College of Swansea, Wales
- Jancis V. Long, Assistant Clinical Professor of Psychology**  
B.S. 1961, London School of Economics; M.A. 1971, University of Chicago; Ph.D. 1979, University of London
- Richard W. Longstreth, Associate Professor of American Civilization**  
B.A. 1968, University of Pennsylvania; Ph.D. 1977, University of California, Berkeley
- Miguel Lopes, Visiting Instructor in Teacher Preparation**  
Ed.M. 1982, Cambridge College
- Sebastian R. Lorigo, Associate Professorial Lecturer in Forensic Sciences**  
B.S. 1970, Philadelphia College of Textiles and Science; M.B.A. 1975, Widener College
- Gerald Dean Love, Professorial Lecturer in Engineering**  
B.S. in C.E. 1949, M.S. in C.E. 1956, Iowa State University; D.Eng. 1975, Rensselaer Polytechnic Institute
- John Carl Lowe, Professor of Geography and Regional Science**  
B.A. 1958, M.A. 1960, George Washington University; Ph.D. 1969, Clark University
- James Michael Luckring, Assistant Professorial Lecturer in Engineering**  
B.S. 1973, M.S. 1974, Purdue University; Ph.D. 1985, North Carolina State University
- Ronald Laurence Luntz, Adjunct Instructor in Exercise Science and Tourism Studies**
- Sharon H. Lynch, Assistant Professor of Teacher Preparation and Special Education**  
B.S. 1968, M.A. 1972, Ph.D. 1984, Wayne State University
- William Francis Lynch, Associate Professor of Education**  
B.A. 1973, University of North Carolina; M.A. 1976, University of Iowa; Ph.D. 1984, University of Maryland
- Gordon Edward Lyon, Associate Professorial Lecturer in Engineering**  
B.S. 1964, Michigan Technological University; M.S. 1966, M.S. 1967, Ph.D. 1972, University of Michigan
- Richard Charles Macon, Professorial Lecturer in Engineering**  
B.S.E.E. 1969, University of South Alabama; M.S.E. 1971, Ph.D. 1973, Southern Methodist University
- James Hunt Maddox, Professor of English**  
B.A. 1965, Princeton University; M.A. 1967, Ph.D. 1969, Yale University
- Lynda Marie Maddox, Associate Professor of Business Administration**  
B.A. 1972, M.A. 1974, Pennsylvania State University; Ph.D. 1978, Southern Illinois University
- Rose Mage, Adjunct Professor of Genetics**  
B.S. 1956, Cornell University; Ph.D. 1963, Columbia University
- Sheila S. Magula, Adjunct Instructor in Special Education**  
B.S. 1966, Radford University; M.S. 1973, Old Dominion University; Ed.S. 1987, George Washington University

- Khalid Mahmood, Professor of Engineering**  
B.A. 1950, B.S. 1953, Panjab University, Pakistan; M.S. 1964, University of Washington; Ph.D. 1971, Colorado State University
- Hosam M. Mahmoud, Associate Professor of Statistics**  
B.S. 1976, B.S. 1979, Cairo University, Egypt; M.S. 1981, Ph.D. 1983, Ohio State University
- Wendy Maiorana, Adjunct Assistant Professor of Art Therapy**  
B.A. 1961, American University; M.A. 1976, George Washington University
- Peter N. Majumdar, Associate Professorial Lecturer in Engineering**  
B.S. 1971, Indian Institute of Technology, Kharagpur; M.S. 1973, University of Michigan; Ph.D. 1983, Catholic University of America
- Marie C. Malaro, Professor of Museum Studies**  
B.A. 1954, Regis College; LL.B. 1957, Boston College
- Donald Malec, Assistant Professorial Lecturer in Statistics**  
B.S. 1975, Southern Illinois University; Ph.D. 1982, State University of New York at Buffalo
- Arun S. Malik, Associate Professor of Economics**  
B.A. 1978, Johns Hopkins University; Ph.D. 1984, Bowdoin College
- Mary J. Mallott, Assistant Professor of Business and Public Policy**  
B.S. 1976, Manchester College; M.S. 1980, Ph.D. 1982, University of Pittsburgh
- Paul Bernard Malone III, Associate Professor of Management Science**  
B.S. 1952, U.S. Military Academy; M.S. in Per.Ad. 1969, D.B.A. 1973, George Washington University
- Forrest Maltzman, Assistant Professor of Political Science**  
B.A. 1986, Wesleyan University; Ph.D. 1992, University of Minnesota
- Doris Louise Mandel, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1982, Connecticut College
- Harold George Mandel, Professor of Pharmacology**  
B.S. 1944, Ph.D. 1949, Yale University
- Arthur Frank Manfredi, Jr., Professorial Lecturer in Engineering**  
B.S. 1965, Cooper Union; M.S. 1968, Polytechnic University; D.Sc. 1975, George Washington University
- Jarol B. Manheim, Professor of Political Communications and of Political Science; Director, National Center for Communication Studies**  
B.A. 1968, Rice University; M.A. 1969, Ph.D. 1971, Northwestern University
- Edward Marasciulo, Professorial Lecturer in Geography and Regional Science**  
B.A. 1950, University of Miami
- F. Landis Markley, Professorial Lecturer in Engineering**  
B.Eng. 1962, Cornell University; Ph.D. 1967, University of California, Berkeley
- William Henry Marlow, Professor of Operations Research**  
B.S. 1947, St. Ambrose College; M.S. 1948, Ph.D. 1951, University of Iowa
- Sylvia A. Marotta, Visiting Assistant Professor of Counseling**  
M.Ed. 1988, Ph.D. 1992, University of Houston
- William Thomas Marquitz, Professorial Lecturer in Engineering**  
B.E.E. 1963, University of Dayton; M.S. 1965, Ph.D. 1967, Michigan State University
- Anne Wills Martin, Visiting Assistant Professor of Administrative Sciences**  
B.A. 1976, M.A. 1979, Ph.D. 1981, Rice University
- Carol Dianne Martin, Associate Professor of Engineering and Applied Science**  
B.A. 1965, Western Maryland College; M.S. 1971, University of Maryland; Ed.D. 1987, George Washington University
- John Thomas Martin, Assistant Professorial Lecturer in Forensic Sciences**  
B.A. 1981, J.D. 1984, Case Western Reserve University
- Terrence Joseph Martin, Instructor in Counseling**  
B.A. in Ed. 1976, M.A. in Ed.&H.D. 1981, George Washington University
- Alicia Martinez, Assistant Professor of Secondary Education**  
B.A. 1978, M.S. 1980, Texas A&M University; Ed.D. 1989, University of Houston
- Carole Maso, Jenny McKean Moore Writer in Washington**  
B.A. 1977, Vassar College
- Pamela A. Mason, Clinical Instructor in Speech and Hearing**  
B.A. 1974, Mary Washington College; M.Ed. 1975, University of Virginia
- Patricia A. Massimini, Assistant Professorial Lecturer in Engineering**  
B.S. 1975, Purdue University; M.S. 1980, University of Washington; M.A. 1984, D.Sc. 1991, George Washington University



- Shelley Ellen Smith Mastran, Associate Professorial Lecturer in Geography and Regional Science**  
B.A. 1965, Vassar College; M.A. 1974, George Washington University
- Anthony James Mastro, Professor of Accountancy**  
B.S. 1951, M.B.A. 1953, New York University; M.A. 1963, University of Notre Dame; C.P.A. 1955, State of New Jersey
- Candance Mathews, Assistant Professor of English as a Foreign Language**  
B.A. 1972, Depauw University; M.S. 1978, Indiana University
- John Cornelius Mathews III, Professorial Lecturer in Engineering**  
J.D. 1963, University of Tennessee
- Peter Matic, Assistant Professorial Lecturer in Engineering**  
B.S. 1977, Illinois Institute of Technology; Ph.D. 1983, Lehigh University
- Sally O'Neill Mauldin, Associate Professorial Lecturer in Engineering**  
B.A. 1970, Elon College; M.A. 1972, Memphis State University; J.D. 1977, College of William and Mary
- Ward Douglas Maurer, Professor of Engineering and Applied Science**  
B.S. 1958, University of Chicago; M.A. 1962, Ph.D. 1965, University of California, Berkeley
- Linda Hanrahan Mauro, Assistant Professor of Secondary Education**  
B.A. 1971, Boston College; M.S. 1972, University of Pennsylvania; Ed.D. 1983, Rutgers University
- Catherine Mavriplis, Assistant Professor of Engineering and Applied Science**  
B.Eng. 1983, McGill University, Canada; S.M. 1986, Ph.D. 1989, Massachusetts Institute of Technology
- Leonard C. Maximon, Research Professor of Physics**  
B.A. 1947, Oberlin College; Ph.D. 1952, Cornell University
- Paul D. Maycock, Professorial Lecturer in Engineering**  
B.S. 1957, M.S. 1962, Iowa State University
- Paul Mazel, Professor of Pharmacology and of Anesthesiology**  
B.S. 1946, Medical College of Virginia of Virginia Commonwealth University; M.S. 1955, Trinity University; Ph.D. 1960, Vanderbilt University
- Amy Jo Mazur, Professor of Special Education**  
B.A. 1971, M.A. 1974, Ed.D. 1977, George Washington University
- Omar Mazzoni, Adjunct Associate Professor of Engineering**  
B.S. 1961, National University of Litoral, Argentina; M.S. 1971, Polytechnic University
- Thomas Andrew Mazzuchi, Associate Professor of Operations Research and of Engineering Management**  
B.A. 1978, Gettysburg College; M.S. 1979, D.Sc. 1982, George Washington University
- David Willard McAleavey, Professor of English; Associate Dean of Columbian College and Graduate School of Arts and Sciences, for Student Services**  
B.A. 1968, M.F.A. 1972, Ph.D. 1975, Cornell University
- Edward McCafferty, Professorial Lecturer in Engineering**  
B.S. 1959, Wilkes College; M.S. 1964, Ph.D. 1968, Lehigh University
- Cynthia McClintock, Professor of Political Science**  
B.A. 1967, Harvard University; M.A. 1968, University of California, Los Angeles; Ph.D. 1976, Massachusetts Institute of Technology
- Jane Ann McDonald, Associate Professor of Education**  
B.A. 1961, University of Florida; M.Ed. 1979, Ed.D. 1987, Virginia Polytechnic Institute and State University
- Michelle Carter McElvaney, Assistant Professorial Lecturer in Engineering**  
B.A. 1977, Loyola College (Maryland); M.A. 1980, University of Maryland
- Patrick W. McGann, Instructor in English**  
B.A. 1980, M.A. 1985, Texas Tech University; Ph.D. 1992, University of Illinois
- Dorn Charles McGrath, Jr., Professor of Geography and Regional Science and of Urban and Regional Planning**  
B.A. 1952, Dartmouth College; M.C.P. 1959, Harvard University
- Michael Francis McGrath, Professorial Lecturer in Engineering**  
B.S. 1970, M.S. 1972, Catholic University of America; D.Sc. 1986, George Washington University
- Marlene C. McGuirl, Associate Professorial Lecturer in Environmental Studies**  
B.A. 1959, Indiana University; J.D. 1963, DePaul University; M.A. 1965, Rosary College; LL.M. 1978, George Washington University
- Graham Wilson McIntyre, Adjunct Professor of Engineering**  
B.S. 1953, U.S. Military Academy; M.S. 1966, University of Southern California

- Keith Hollis McKenney, Adjunct Associate Professor of Biochemistry and Molecular Biology and of Genetics**  
B.S. 1974, American University; Ph.D. 1982, Johns Hopkins University
- James M. McMichael, Professorial Lecturer in Engineering**  
B.S. 1965, M.S. 1966, University of Maryland; Ph.D. 1971, University of Colorado
- Chester Barton McMullen III, Adjunct Assistant Professor of English**  
B.A. 1970, M.A. 1974, University of South Florida; Ph.D. 1992, University of Colorado
- Gerald Robert McNichols, Professorial Lecturer in Engineering**  
B.S. 1965, Case Western Reserve University; M.S. 1966, University of Pennsylvania; D.Sc. 1976, George Washington University
- Cynthia J. McSwain, Associate Professor of Public Administration**  
B.A. 1972, Vanderbilt University; M.P.A. 1978, Ph.D. 1980, University of North Carolina
- Asha K. Mehrotra, Professorial Lecturer in Engineering**  
B.S. 1961, University of Calcutta, India; M.S. 1965, University of Roorkee, India; M.S. 1968, Nova Scotia Technical College, Canada; Ph.D. 1982, Polytechnic University
- Subhash C. Mehrotra, Associate Professorial Lecturer in Engineering**  
B.Tech. 1959, Indian Institute of Technology, Kharagpur, India; M.S. 1967, University of Iowa; Ph.D. 1973, University of California
- Philip G. Meikle, Assistant Professorial Lecturer in Engineering**  
B.S.E.M. 1961, M.S.E.M. 1965, West Virginia University; M.E.A. 1980, George Washington University
- Kenneth Everett Melson, Professorial Lecturer in Forensic Sciences**  
B.A. 1970, Denison University; J.D. 1973, George Washington University
- Arnold Charles Meltzer, Professor of Engineering and Applied Science**  
B.S. in Engr. 1958, M.S. in Engr. 1961, D.Sc. 1967, George Washington University
- Gary Stephen Meltzer, Assistant Professor of Classics and of Humanities**  
B.A. 1973, M.A. 1981, M.Phil. 1984, Ph.D. 1987, Yale University
- Constantine C. Menges, Research Professor of International Affairs**  
B.A. 1960, Columbia College; Ph.D. 1968, Columbia University
- Henry Merchant, Associate Professor of Biology**  
B.S. 1964, M.S. 1966, University of Maryland; Ph.D. 1970, Rutgers University
- Bernard Matthew Mergen, Professor of American Civilization**  
B.A. 1959, University of Nevada; M.A. 1960, Ph.D. 1968, University of Pennsylvania
- Carl Ronald Merrill, Adjunct Professor of Genetics and Professorial Lecturer in Biochemistry and Molecular Biology**  
B.S. 1958, College of William and Mary; M.D. 1962, Georgetown University
- David John Michel, Professorial Lecturer in Engineering**  
B.S. 1964, University of Missouri, Rolla; M.S. 1966, Ph.D. 1968, Pennsylvania State University
- James R. Millar, Professor of International Affairs; Associate Dean of the Elliott School of International Affairs**  
B.A. 1958, University of Texas; Ph.D. 1965, Cornell University
- Bennett Miller, Professorial Lecturer in Engineering**  
B.A. 1959, M.A. 1961, Ph.D. 1965, Columbia University
- James Carl Miller, Professor of Psychology**  
B.A. 1958, J.D. 1962, Ph.D. 1966, Yale University
- John Houston Miller, Associate Professor of Chemistry**  
B.A. 1976, Oberlin College; Ph.D. 1980, University of Virginia
- Kathleen R. Miller, Assistant Clinical Professor of Psychology**  
B.A. 1972, Michigan State University; Ph.D. 1981, George Washington University
- Lenore Donna Miller, Associate Professorial Lecturer in Art; Director, Dimock Gallery**  
B.A. 1969, Goucher College; M.F.A. 1972, George Washington University
- Lillian Miller, Professorial Lecturer in American Civilization and Art History**  
B.A. 1943, Radcliffe College; M.A. 1948, Ph.D. 1962, Columbia University
- Nancy J. Miller, Clinical Instructor in Art Therapy**  
B.S. 1958, University of Missouri; M.A. 1978, George Washington University
- Elizabeth Ann Mills, Clinical Instructor in Art Therapy**  
B.A. 1978, University of Toronto; M.A. 1989, Concordia University, Canada
- Joshua M. Mitchell, Assistant Professor of Political Science**  
B.G.S. 1980, M.A. 1984, University of Michigan; M.A. 1986, Ph.D. 1989, University of Chicago
- Mohammad Reza Modarres-Hakimi, Assistant Professor of Statistics**  
B.S. 1981, M.S. 1982, Ph.D. 1990, American University



- Daniel D. Moerder, Assistant Professorial Lecturer in Engineering**  
B.S., M.S. 1980, Ph.D. 1984, Drexel University
- Leo Carl Moersen, Associate Professor of Accountancy and Business Law**  
B.S. 1978, University of Connecticut; J.D. 1981, College of William and Mary
- Abolghasem Asadi Moghadam, Associate Professorial Lecturer in Engineering**  
B.S. 1964, Abadan Institute of Technology, Iran; M.S. in Adm. 1973, M.S. 1975, App.Sc. 1980, D.Sc. 1986, George Washington University
- Manouchehr Mohajeri, Professorial Lecturer in Engineering**  
B.Sc. 1964, Tehran University, Iran; M.S. 1968, D.Sc. 1977, Massachusetts Institute of Technology
- Lanning Edward Moldauer, Assistant Clinical Professor of Psychology**  
B.A. 1969, University of Pennsylvania; Ph.D. 1981, George Washington University
- Samuel Burdick Molina, Associate Professor of Art**  
B.A. 1964, M.A. 1969, University of Wyoming
- William H. Money, Associate Professor of Administrative Sciences**  
B.A. 1968, University of Richmond; M.B.A. 1969, Indiana University; Ph.D. 1977, Northwestern University
- Richard J. Montali, Adjunct Associate Professor of Pathology (Comparative Pathology)**  
D.V.M. 1964, Cornell University
- Akbar Montaser, Professor of Chemistry**  
B.S. 1969, Pahlavi University, Iran; Ph.D. 1974, Michigan State University
- Mary Elizabeth Moody, Assistant Professorial Lecturer in Speech and Hearing**  
B.A. 1968, College of New Rochelle; M.A. 1970, Catholic University of America
- Sally Ann Moody, Associate Professor of Anatomy**  
B.A. 1973, Goucher College; M.S. 1976, University of Maryland; Ph.D. 1981, University of Florida
- Sharon M. Moody, Assistant Professor of Accountancy**  
B.A. 1976, McKendree College; M.B.A. 1979, Southern Illinois University; Ph.D. 1987, University of Mississippi
- Terry William Moody, Professor of Biochemistry and Molecular Biology and of Genetics**  
B.S. 1972, California Institute of Technology; Ph.D. 1978, University of California, Berkeley
- Dorothy Adele Moore, Professor of Education**  
B.A. 1954, University of Maryland; M.A. 1959, A.P.C. 1964, Ed.D. 1970, American University
- Michael Owen Moore, Assistant Professor of Economics and International Affairs**  
B.A. 1979, University of Texas; M.S. 1984, Ph.D. 1988, University of Wisconsin
- David Dunston Moran, Adjunct Professor of Engineering**  
B.S. 1965, M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1971, University of Iowa
- Kim Moreland, Associate Professor of English**  
B.A. 1976, Ohio University; M.A. 1978, State University of New York at Binghamton; Ph.D. 1984, Brown University
- Eugene A. Morelli, Assistant Professorial Lecturer in Engineering**  
B.S. 1981, Bucknell University; M.S.E. 1984, Princeton University; D.Sc. 1990, George Washington University
- John Andrew Morgan, Jr., Professor of Political Science and Public Affairs**  
B.A. 1957, Stetson University; M.A. 1959, Ph.D. 1963, Duke University
- Joseph David Morgan, Jr., Professorial Lecturer in Engineering**  
B.S. 1959, U.S. Air Force Academy; M.S. 1968, Ph.D. 1974, Georgia Institute of Technology
- David William Morris, Assistant Professor of Biological Sciences and of Genetics**  
B.Sc. 1972, Ph.D. 1976, University of Leeds, England
- Jon R. Morris, Professorial Lecturer in Administrative Sciences**  
B.S. 1963, Illinois Wesleyan University; M.A. 1965, University of Denver; Ph.D. 1971, University of Colorado
- Michael F. Moses, Assistant Professor of Mathematics**  
B.Sc. 1980, Ph.D. 1983, Monash University, Australia
- Daniel Moshenberg, Associate Professor of English**  
B.S. 1976, Johns Hopkins University; M.A. 1977, M.Phil. 1979, Ph.D. 1987, Columbia University
- Faye Stollman Moskowitz, Associate Professor of English**  
B.A. 1970, M.A. 1979, George Washington University

- James Moss, Assistant Professorial Lecturer in Engineering**  
B.S. 1962, Tennessee Polytechnic Institute; M.S. 1968, University of Virginia; Ph.D. 1974, Virginia Polytechnic Institute and State University
- James Norvel Moss, Associate Professorial Lecturer in Engineering**  
B.S. 1962, Tennessee Polytechnic Institute; M.S. 1968, University of Virginia; Ph.D. 1974, Virginia Polytechnic Institute and State University
- David C. Mount, Assistant Professorial Lecturer in Forensic Sciences**  
J.D. 1983, Pepperdine University
- Vivekananda Mukhopadhyay, Associate Professorial Lecturer in Engineering**  
B.Tech. 1968, Indian Institute of Technology; M.S. 1970, Sc.D. 1972, Massachusetts Institute of Technology
- Daniel R. Mulville, Professorial Lecturer in Engineering**  
B.S. in M.E. 1962, M.S. 1966, George Washington University; Ph.D. 1974, Catholic University of America
- Edward Lile Murphree, Jr., Professor of Engineering Management**  
B.S.C.E. 1954, M.A. 1962, University of Mississippi; M.S. 1958, Massachusetts Institute of Technology; Ph.D. 1967, University of Illinois
- Teresa Anne Murphy, Associate Professor of American Civilization**  
B.A. 1973, University of California, Berkeley; M.A. 1976, M.Phil. 1977, Ph.D. 1982, Yale University
- Arthur Joseph Murray, Associate Professorial Lecturer in Engineering**  
B.S.E.E. 1975, Lehigh University; M.E.A. 1982, D.Sc. 1989, George Washington University
- Clayman Campbell Myers, Jr., Professorial Lecturer in Engineering**  
B.S.M.E. 1952, University of Pennsylvania; M.S. in Adm. 1977, George Washington University; M.A. 1979, University of Southern California
- Michael Kenneth Myers, Professor of Engineering and Applied Science**  
B.A. 1962, Willamette University; B.S. 1962, M.S. 1963, Ph.D. 1966, Columbia University
- Thomas J. Nagy, Associate Professor of Expert Systems**  
B.A. 1965, St. Mary's University; M.S. 1970, Trinity University; Ph.D. 1974, University of Texas
- Yacoub Mohammad Najjar, Assistant Professor of Engineering and Applied Science**  
B.S. 1983, Yarmouk University, Jordan; M.S. 1986, Ph.D. 1990, University of Oklahoma
- Winston Anthony Napier, Visiting Assistant Professor of English**  
B.A. 1974, William Paterson College; M.A. 1978, Ph.D. 1991, Howard University
- Bhagirath Narahari, Assistant Professor of Engineering and Applied Science**  
B.E. 1982, Birla Institute of Technology and Science, India; M.S.E. 1984, Ph.D. 1987, University of Pennsylvania
- Honey Weinstein Nashman, Assistant Professor of Human Services**  
B.S. 1956, New York University; M.S. 1957, Smith College
- Seyyed Hossein Nasr, University Professor of Islamic Studies**  
B.S. 1954, Massachusetts Institute of Technology; M.A. 1956, Ph.D. 1958, Harvard University
- Henry Richard Nau, Professor of Political Science and International Affairs**  
B.S. 1963, Massachusetts Institute of Technology; M.A. 1967, Ph.D. 1972, Johns Hopkins University
- Tapan Kumar Nayak, Associate Professor of Statistics**  
B.Sc. 1976, University of Calcutta, India; M.Stat. 1979, Indian Statistical Institute; Ph.D. 1983, University of Pittsburgh
- Edgar Henry Neal, Associate Professorial Lecturer in Engineering**  
B.S.(E.E.) 1958, Pennsylvania State University; M.S. 1976, George Washington University
- Thomas J. Nelson, Assistant Professorial Lecturer in Engineering**  
B.S.E.E. 1981, Old Dominion University
- S. Edward Nevius, Professorial Lecturer in Engineering**  
B.A. 1967, University of Kansas; M.S. 1969, Kansas State University; Ph.D. 1975, Florida State University
- Kathryn Estelle Newcomer, Professor of Public Administration**  
B.S. 1971, M.A. 1974, University of Kansas; Ph.D. 1978, University of Iowa
- Christopher Ng, Professorial Lecturer in Engineering**  
B.S. 1944, Chiao-Tung University, China; M.S. 1959, University of Connecticut; Ph.D. 1973, University of Maryland
- David Lee Nicholson, Professorial Lecturer in Engineering**  
B.S.E.E. 1964, Wichita State University; M.E.E. 1966, Rensselaer Polytechnic Institute; Ph.D. 1970, State University of New York at Buffalo; M.S. in Adm. 1977, George Washington University
- Kenneth Eugene Nideffer, Assistant Professorial Lecturer in Engineering**  
B.S. 1962, Purdue University; M.S. 1969, Air Force Institute of Technology; M.B.A. 1975, Auburn University; D.Sc. 1988, George Washington University



- David Paine Niles, Adjunct Assistant Professor of Education**  
B.A. 1964, St. Lawrence University; M.A. 1974, Western Kentucky University; Ed.D. 1988, George Washington University
- Avisé Stuart Nissen, Assistant Professor of English**  
B.A. 1966, Florida Presbyterian College; M.A. 1973, University of South Florida; M.S. 1975, Ph.D. 1984, University of Iowa
- Philip D. Noguchi, Adjunct Professor of Genetics**  
B.A. 1970, University of California, Berkeley; M.D. 1974, George Washington University
- Walter Robert Nunn, Professorial Lecturer in Statistics**  
B.A. 1957, M.A. 1961, University of California, Berkeley; Ph.D. 1972, George Washington University
- Stephen O'Brien, Adjunct Professor of Genetics**  
B.S. 1966, St. Francis College; Ph.D. 1971, Cornell University
- Thomas Kevin O'Brien, Associate Professorial Lecturer in Engineering**  
B.S. 1972, M.S. 1976, Ph.D. 1978, Virginia Polytechnic Institute and State University
- John Francis O'Dea, Associate Professorial Lecturer in Engineering**  
B.S. 1968, Webb Institute of Naval Architecture; M.S. 1970, Ph.D. 1974, Massachusetts Institute of Technology
- Lynn R. Offermann, Associate Professor of Psychology**  
B.A. 1975, State University of New York College at Oswego; M.A. 1978, Ph.D. 1981, Syracuse University
- Joseph Robert Offutt, Professorial Lecturer in Engineering**  
B.S. 1965, U.S. Coast Guard Academy; M.S. 1970, Naval Postgraduate School
- Liam O'Grady, Assistant Professorial Lecturer in Forensic Sciences**  
B.A. 1973, Franklin and Marshall College; J.D. 1977, George Mason University
- Charles O'Rear, Professor of Forensic Sciences**  
B.S. 1957, Virginia Polytechnic Institute and State University; M.S. 1961, M.C. 1964, University of Richmond; Ph.D. 1970, Medical College of Virginia of Virginia Commonwealth University
- Jan Marc Orenstein, Professor of Pathology**  
B.A. 1963, Johns Hopkins University; Ph.D. 1969, M.D. 1971, State University of New York Downstate Medical Center
- Ratko Orlandic, Visiting Assistant Professor of Statistics**  
B.S. 1984, Moscow Energy Institute, USSR; M.S. 1986, Ph.D. 1989, University of Virginia
- Robert John Oslund, Professorial Lecturer in Telecommunication**  
B.S. 1982, University of Wyoming; M.A. 1988, Ph.D. 1975, American University
- Lisa E. Osterman, Assistant Professor of Geology**  
B.S. 1975, University of Dayton; M.S. 1977, University of Maine; Ph.D. 1982, University of Colorado
- John Edward Ott, Professor of Health Care Sciences, of Pediatrics, and of Health Services Administration**  
B.S. 1959, M.D. 1963, University of Pittsburgh
- Marta A. Oyhenart, Lecturer in Business Administration**  
B.A. 1979, George Mason University; M.B.A. 1982, George Washington University
- Türker Ozdogan, Professor of Ceramics**  
Master of Ceramics Diploma 1967, School of Applied Fine Arts, Turkey; M.F.A. 1972, George Washington University
- Randall Kent Packer, Professor of Biology**  
B.S. 1967, Lock Haven State College; Ph.D. 1971, Pennsylvania State University
- Chei-Min Paik, Professor of Accountancy and Quantitative Methods**  
B.B.A. 1957, University of Minnesota; M.B.A. 1959, University of California, Los Angeles; D.B.A. 1963, Harvard University
- Nicholas B. Paley, Associate Professor of Elementary Education**  
B.A. 1969, Beloit College; M.S. 1971, Ph.D. 1984, University of Wisconsin
- Phyllis Marynick Palmer, Associate Professor of Women's Studies and of American Civilization**  
B.A. 1966, Oberlin College; M.A. 1967, Ph.D. 1973, Ohio State University
- Ronald D.F. Palmer, Diplomatic Consultant and Adjunct Professor of International Affairs**  
B.A. 1954, Howard University; M.A. 1957, Johns Hopkins University
- Angela C. Pao, Assistant Professor of English and of Theatre and Dance**  
B.A. 1973, Wellesley College; M.A. 1977, New York University; M.A. 1983, Smith College; Ph.D. 1989, University of California
- Sotiris Aristeidou Papantonopoulos, Assistant Professor of Engineering Management**  
Diploma 1982, University of Patras, Greece; M.S. 1983, University of California; Ph.D. 1990, Purdue University

**John Paradiso, Associate Professorial Lecturer in Art**

B.A. 1971, Manhattan College; B.F.A. 1978, M.F.A. 1982, George Washington University

**Salvatore Rocco Paratore, Professor of Education**

B.A. 1957, Colgate University; M.S. 1967, Yeshiva University; Ph.D. 1973, Syracuse University

**Martha Pardavi-Horvath, Professor of Engineering and Applied Science**

M.Sc. 1967, Moscow State University; Ph.D. 1985, Hungarian Academy of Sciences

**Yoon Shik Park, Professor of International Banking and Finance**

B.A. 1964, Kyung Hee University, Korea; M.B.A. 1967, Fairleigh Dickinson University; D.B.A. 1970, Harvard University; M.A. 1973, Ph.D. 1978, George Washington University

**You Keun Park, Assistant Professorial Lecturer in Engineering**

B.S. 1973, Seoul National University, Korea; M.S. 1983, George Mason University

**You-Me Park, Instructor in English**

B.A. 1982, M.A. 1984, Seoul National University, Korea

**William Carleton Parke, Associate Professor of Physics**

B.S. 1963, Ph.D. 1967, George Washington University

**Charles Erskine Parks, Assistant Clinical Professor of Psychology**

B.A. 1971, Davidson College; M.Div. 1976, Yale University; Ph.D. 1983, George Washington University

**Gail Kern Paster, Professor of English**

B.A. 1968, Smith College; M.Phil. 1970, Ph.D. 1972, Yale University

**Steven Robert Patierno, Assistant Professor of Pharmacology and of Genetics**

B.S. 1981, University of Connecticut; Ph.D. 1985, University of Texas at Houston

**John Franklin Patrick, Adjunct Associate Professor of Engineering**

B.S. 1955, University of Virginia; M.A. 1961, George Washington University; Ph.D. 1977, University of Maryland

**George Thomas Patton, Professorial Lecturer in Engineering**

B.S.E. 1955, Illinois Institute of Technology; M.S. 1966, Ph.D. 1968, Stanford University

**Gerald Lee Pauler, Professorial Lecturer in Engineering**

B.A. 1963, Kansas State Teachers College; M.B.A. 1970, University of Mississippi; Ph.D. 1974, Oklahoma State University

**Sidney Fay Pauls, Professorial Lecturer in Engineering**

B.A. 1958, College of William and Mary; M.S. in Adm. 1970, George Washington University

**Donald Clark Paup, Professor of Exercise Science**

B.A. 1961, Occidental College; M.S. 1969, Ph.D. 1970, Tulane University

**Leonard Gregory Pawlson, Professor of Health Care Sciences, of Medicine, and of Health Services Administration**

B.S. 1965, Pennsylvania State University; M.D. 1969, University of Pittsburgh; M.P.H. 1976, University of Washington

**Harold Jackson Peake, Professorial Lecturer in Engineering**

B.S.E.E. 1942, Virginia Polytechnic Institute; M.S.E.E. 1953, University of Maryland; M.E.A. 1969, George Washington University

**Joseph Pelzman, Professor of Economics**

B.S. 1971, Ph.D. 1978, Boston College

**Alan Irvin Penn, Assistant Professorial Lecturer in Mathematics**

B.A. 1964, M.A. 1967, Ph.D. 1971, University of Maryland

**Catherine Perge, Assistant Professorial Lecturer in Museum Studies**

B.A. 1978, University of Vermont; M.A. 1982, George Washington University

**David Carter Perry, Associate Professor of Pharmacology**

B.A. 1970, Harvard University; Ph.D. 1981, University of California, San Francisco

**James Hilliard Perry, Jr., Professor of Business Administration**

B.A. 1964, Duke University; M.A., M.B.A. 1970, Ph.D. 1974, Stanford University

**Cheryl L. Person, Assistant Professorial Lecturer in Speech and Hearing**

B.S. 1973, Miami University; M.A. 1978, University of Cincinnati

**Rolf A. Peterson, Professor of Psychology and of Psychiatry and Behavioral Sciences**

B.S. 1964, University of Wisconsin-Oshkosh; M.S. 1967, Ph.D. 1970, University of Iowa

**Robert T. Petruska, Assistant Professorial Lecturer in Finance**

B.S. 1960, Pennsylvania State University; M.Ed. 1991, George Mason University

**Kenna Dale Peusner, Professor of Anatomy**

B.S. 1968, Simmons College; Ph.D. 1974, Harvard University

**J. Roger Peverley, Associate Professor of Physics**

B.A. 1960, M.A. 1964, Ph.D. 1964, Cambridge University



- Paul S. Peyser, Associate Professor of Finance**  
B.A. 1966, State University of New York at Binghamton; M.A. 1970, Ph.D. 1979, University of Wisconsin
- James E. Pfandtner, Associate Professorial Lecturer in Engineering**  
B.S. 1968, Ph.D. 1974, Wayne State University; M.S. 1970, University of Michigan
- Elizabeth A. Phillips, Assistant Research Professor of Statistics**  
B.A. 1970, M.A. 1978, Oxford University, England; M.Sc. 1971, University of Reading, England; Ph.D. 1992, George Washington University
- Robert F. Phillips, Associate Professor of Economics**  
B.A. 1978, University of California, Berkeley; M.A. 1980, M.Phil. 1981, Ph.D. 1985, Columbia University
- Dante James Picciano, Adjunct Associate Professor of Genetics**  
B.S. 1966, M.S. 1969, Ph.D. 1973, George Washington University
- Raymond L. Pickholtz, Professor of Engineering and Applied Science**  
B.E.E. 1954, M.E.E. 1958, City University of New York, City College; Ph.D. 1966, Polytechnic University
- Arlene Arrigan Pietranton, Clinical Instructor in Speech and Hearing**  
B.A. 1974, M.A. 1975, George Washington University
- Bernard Thomas Pitsvada, Professor of Public Administration**  
B.S. 1955, M.B.A. 1963, Temple University; Ph.D. 1972, American University
- Harry Pitt, Visiting Professor of Educational Leadership**  
B.S. 1952, M.S. 1954, Ed.D. 1965, George Washington University
- Neal Jay Plotkin, Professorial Lecturer in Engineering**  
B.A. 1961, Columbia College; M.A. 1968, Cornell University; Ph.D. 1972, Syracuse University
- Judith Ann Abrams Plotz, Professor of English**  
B.A. 1960, Radcliffe College; B.A. 1962, M.A. 1966, Cambridge University; Ph.D. 1965, Harvard University
- Dennis A. Pluchinsky, Assistant Professorial Lecturer in Forensic Sciences**  
B.A. 1973, Madison College; M.A. 1978, George Washington University
- Joseph L. Pokorney, Professorial Lecturer in Engineering**  
B.S. 1962, University of Wisconsin; M.S. 1967, Northeastern University
- Mihael H. Polymeropoulos, Adjunct Assistant Professor of Genetics**  
M.D. 1983, University of Patras Medical School, Greece
- Francis M. Ponti, Professorial Lecturer in Statistics**  
B.S. 1961, M.B.A. 1963, Drexel University
- Paul John Poppen, Associate Professor of Psychology**  
B.A. 1969, Central University of Iowa; Ph.D. 1973, Cornell University
- Jerrold Morton Post, Professor of Psychiatry, Political Psychology, and International Affairs**  
B.A. 1956, M.D. 1960, Yale University
- Lee Etta Powell, Visiting Professor of Educational Leadership**  
B.S. 1956, District of Columbia Teacher's College; M.A. 1966, Ed.D. 1976, George Washington University
- Marie Daly Price, Assistant Professor of Geography and Regional Science**  
B.A. 1984, University of California, Berkeley; M.A. 1986, Ph.D. 1991, Syracuse University
- E. Brian Pritchard, Professorial Lecturer in Engineering**  
B.S. 1957, M.S. 1959, Virginia Polytechnic Institute and State University
- Wilbur L. Pritchard, Professorial Lecturer in Engineering**  
B.E.E. 1943, City University of New York, City College
- Andrew Procko, Associate Professorial Lecturer in Engineering**  
B.A. 1948, Washington and Jefferson College; M.B.A. 1977, Catholic University of Puerto Rico
- Patricia Prugh, Clinical Instructor in Art Therapy**  
B.A. 1970, M.A. 1983, George Washington University
- William A. Pucilowsky, Associate Professor of Theatre**  
B.S. 1964, Wilkes College; M.F.A. 1972, Boston University
- Lawrence Elwood Putnam, Associate Professorial Lecturer in Engineering**  
B.A.E. 1959, M.A.E. 1964, University of Virginia; M.E.A. 1985, George Washington University
- Lynne Rick Putnam, Associate Professor of Education**  
B.A. 1966, Smith College; Ed.M. 1975, Harvard University; Ed.D. 1981, University of Pennsylvania
- Jon Alrik Quitslund, Professor of English**  
B.A. 1961, Reed College; Ph.D. 1967, Princeton University
- Sonya Antoinette Quitslund, Associate Professor of Religion**  
B.A. 1958, Seattle University; M.A. 1964, Ph.D. 1967, Catholic University of America

- Victoria Rab, Adjunct Assistant Professor of Special Education**  
B.A. 1974, Dickinson College; M.A. in Ed. 1976, Ed.D. 1991, George Washington University
- George A. Rabchevsky, Assistant Professorial Lecturer in Geology**  
Ph.D. 1972, George Washington University
- Eulalia C. Rach, Assistant Professor of Tourism Studies**  
B.S. 1976, University of Wisconsin-Platteville; M.B.A. 1985, University of Wisconsin-Whitewater; Ed.D. 1992, George Washington University
- Ivatury Sanyasi Raju, Professorial Lecturer in Engineering**  
B.E. 1965, Andhra University, India; M.E. 1967, Ph.D. 1973, Indian Institute of Science, India
- David Ramaker, Professor of Chemistry**  
B.S. 1965, University of Wisconsin-Milwaukee; M.S. 1968, Ph.D. 1971, University of Iowa
- Ulf Rudiger Rapp, Adjunct Professor of Genetics**  
M.D. 1969, University of Freiburg, Germany; Ph.D. 1975, University of Wisconsin
- Martha Norman Rashid, Professor of Education**  
Ed.B. 1949, State University of New York College at Geneseo; M.A. 1951, Ph.D. 1955, University of Iowa
- John E. Rasmussen, Professor of Engineering Management**  
B.S. 1947, U.S. Naval Academy; D.Sc. 1984, George Washington University
- Pradeep A. Rau, Associate Professor of Business Administration**  
B.S. 1972, Indian Institute of Technology; M.B.A. 1974, Indian Institute of Management; D.B.A. 1983, Kent State University
- Peter Reddaway, Professor of Political Science and International Affairs**  
B.A. 1962, M.S. 1966, Cambridge University
- Jess C. Reed, Associate Professorial Lecturer in Telecommunication**  
B.S. 1974, Shepherd College; M.B.A. 1986, Mount St. Mary's College (Maryland)
- Philip Norman Reeves, Professor of Health Services Management and Policy and of Health Care Sciences**  
M.B.A. 1959, University of Chicago; D.B.A. 1970, George Washington University
- Joan Roddy Regnell, Associate Professor of Speech and Hearing**  
B.A. 1954, M.A. 1960, George Washington University
- Scheherazade S. Rehman, Assistant Professor of International Finance and Business**  
B.B.A. 1985, M.B.A. 1989, George Washington University
- Kari B. Reiber, Associate Professorial Lecturer in Forensic Sciences**  
M.D. 1982, University Autonoma de Madrid, Spain
- Bernard Reich, Professor of Political Science and International Affairs**  
B.A. 1961, City University of New York, City College; M.A. 1963, Ph.D. 1964, University of Virginia
- Melvin Reich, Professor of Microbiology and Immunology**  
B.S. 1953, City University of New York, City College; M.S. 1957, Ph.D. 1960, Rutgers University
- Walter Phillip Reid, Adjunct Professor of Engineering**  
B.S. 1938, M.S. 1939, Carnegie-Mellon University; Ph.D. 1942, University of Pittsburgh
- Carol A. Reisen, Assistant Professorial Lecturer in Psychology**  
B.A. 1970, Ph.D. 1983, George Washington University
- David Reiss, Professor of Psychiatry and Behavioral Science, of Medicine, and of Psychology**  
B.A. 1958, M.D. 1962, Harvard University
- Leo Paul Ribuffo, Professor of History**  
B.A. 1966, Rutgers University; M.Phil. 1969, Ph.D. 1976, Yale University
- Charles Edward Rice, Professor of Psychology**  
B.S. 1954, Iowa State University of Science and Technology; Ph.D. 1959, Case Western Reserve University
- Thomas Richards, Professorial Lecturer in Administrative Sciences**  
B.A. 1960, Ohio State University; M.B.A. 1972, Central Michigan University; D.B.A. 1981, George Washington University
- Max Norman Richburg, Assistant Professorial Lecturer in Business Administration**  
B.S. 1967, Auburn University; J.D. 1971, University of Alabama
- Richard Kenneth Riegelman, Professor of Health Care Sciences, of Medicine, and of Health Services Administration**  
M.D. 1973, University of Wisconsin; M.P.H. 1975, Ph.D. 1982, Johns Hopkins University
- Ray Charles Rist, Adjunct Professor of Educational Leadership**  
B.A. 1967, Valparaiso University; M.A. 1968, Ph.D. 1970, Washington University



- J. Carlos Rivero, Assistant Professor of Psychology**  
B.A. 1984, Columbia University; M.A. 1988, Ph.D. 1991, New York University
- David Caron Roberts, Adjunct Professor of Engineering**  
B.S. 1965, Johns Hopkins University; M.S.E. 1968, University of Pennsylvania; M.S. 1973, University of Maryland
- Markley Roberts, Professorial Lecturer in Administrative Sciences**  
B.A. 1951, Princeton University; M.A. 1960, Ph.D. 1970, American University
- Walter R. Roberts, Professorial Lecturer in International Affairs; Diplomat-in-Residence, Elliott School of International Affairs**  
M.Litt. 1941, Ph.D. 1980, Cambridge University
- E. Arthur Robinson, Jr., Associate Professor of Mathematics**  
B.S. 1977, Tufts University; M.A. 1981, Ph.D. 1983, University of Maryland
- Lilien Filipovitch Robinson, Professor of Art**  
B.A. 1962, M.A. 1965, George Washington University; Ph.D. 1978, Johns Hopkins University
- Fernando Robles, Associate Professor of International Marketing**  
B.S. 1968, Universidad Nacional de Ingenieria, Peru; M.A. 1970, ESAN, Peru; M.B.A. 1972, Georgia State University; Ph.D. 1979, Pennsylvania State University
- Richard Rodriguez, Assistant Professorial Lecturer in Art**  
B.A. 1972, University of Virginia; M.F.A. 1981, George Washington University
- James Lawton Rogers, Jr., Associate Professorial Lecturer in Engineering**  
B.S. 1968, Auburn University; M.S. 1973, College of William and Mary; M.S. in Adm. 1978, George Washington University
- Sharon J. Rogers, Adjunct Associate Professor of Sociology; Associate Vice President for Academic Affairs**  
B.A. 1963, Bethel College; M.A. 1967, University of Minnesota; Ph.D. 1976, Washington State University
- Derrill Conway Rohlfs, Associate Professor of Engineering and Applied Science**  
B.E.E. 1955, M.S. in Engr. 1959, George Washington University; P.E.
- Cynthia A. Rohrbeck, Associate Professor of Psychology**  
B.A. 1980, Cornell University; M.A. 1983, Ph.D. 1986, University of Rochester
- Robert Richard Romano, Adjunct Professor of Engineering**  
B.S. 1968, Southwest Texas State University; M.S. 1971, M.S. 1972, University of Michigan; Ph.D. 1976, Purdue University
- Ann Romines, Associate Professor of English**  
B.A. 1964, Central Methodist College; M.A. 1968, Tufts University; Ph.D. 1977, George Washington University
- Yongwu Rong, Assistant Professor of Mathematics**  
B.S. 1983, University of Science and Technology of China; Ph.D. 1989, University of Texas, Austin
- Carolyn Rusch Rose, Adjunct Associate Professor of Art and Anthropology**  
B.A. 1971, Sweet Briar College; M.A. 1976, George Washington University
- Theodore H. Rosen, Associate Professorial Lecturer in Administrative Sciences**  
B.A. 1969, George Washington University; M.A. 1971, Temple University; Ph.D. 1984, George Washington University
- James N. Rosenau, University Professor of International Affairs**  
B.A. 1948, Bard College; M.A. 1949, Johns Hopkins University; Ph.D. 1957, Princeton University
- William F. Rosenberger, Assistant Research Professor of Statistics**  
B.A. 1986, Towson State University; M.Phil. 1990, Ph.D. 1992, George Washington University
- Jeffrey Mark Rosenstein, Professor of Anatomy and of Neurological Surgery**  
B.A. 1971, Kent State University; Ph.D. 1976, Pennsylvania State University
- Shirley M. Ross, Assistant Professorial Lecturer in Administrative Sciences**  
B.A. 1975, University of Missouri; M.A. 1988, Ph.D. 1990, George Washington University
- Kathleen Ross-Kidder, Assistant Professorial Lecturer in Psychology**  
B.A. 1965, University of Michigan; M.A. 1978, George Mason University; Ph.D. 1990, George Washington University
- Shmuel Rotenstreich, Associate Professor of Engineering and Applied Science**  
B.S. 1974, Tel Aviv University; M.S. 1982, Ph.D. 1983, University of California, San Diego
- Lawrence Allen Rothblat, Professor of Psychology and of Anatomy**  
B.A. 1964, M.A. 1967, Ph.D. 1968, University of Connecticut
- Carol A. Rothenbacher, Adjunct Assistant Professor of Special Education**  
B.S. 1981, Saint Cloud State University; M.A. 1983, George Washington University; Ed.D. 1992, George Washington University

**Walter Frederick Rowe, Professor of Forensic Sciences**

B.S. 1967, Emory University; M.A. 1968, Ph.D. 1975, Harvard University

**David Alton Rowley, Professor of Chemistry; Assistant Dean of Columbian College and Graduate School of Arts and Sciences**

B.S. 1963, M.S. 1964, State University of New York at Albany; Ph.D. 1968, University of Illinois

**Morton M. Rumberg, Assistant Professorial Lecturer in Administrative Sciences**

B.A. 1964, Arizona State University; M.A. 1972, National College of Education; Ed.D. 1987, Catholic University of America

**Robert Warren Rycroft, Associate Professor of Political Science and International Affairs**

B.A. 1967, M.A. 1972, Ph.D. 1976, University of Oklahoma

**Raymond Theodore Rye II, Lecturer in Geology**

B.S. 1955, Iowa State University; M.S. 1971, George Washington University

**Bradley William Sabelli, Assistant Professor of Theatre**

B.F.A. 1970, Florida Atlantic University; M.A. 1972, California State University, Humboldt; M.F.A. 1974, George Washington University

**Howard Morley Sachar, Charles E. Smith Professor of Modern Jewish History**

B.A. 1947, Swarthmore College; M.A. 1950, Ph.D. 1953, Harvard University

**James Minor Sachlis, Associate Professor of Finance**

B.S. 1964, M.B.A. 1966, D.B.A. 1975, University of Maryland

**Robert Sadacca, Professorial Lecturer in Administrative Sciences**

B.A. 1949, Swarthmore College; M.A. 1952, Columbia University; Ph.D. 1962, Princeton University

**Brian Safer, Adjunct Associate Professor of Genetics**

B.S. 1964, Columbia University; M.S. 1967, M.D. 1969, Baylor College of Medicine; Ph.D. 1973, University of Pennsylvania

**Christopher E. Sager, Assistant Professor of Psychology**

B.A. 1985, San Diego State University; Ph.D. 1990, University of Minnesota

**Debabrata Saha, Associate Professor of Engineering and Applied Science**

B.S. 1976, B.Tech. 1979, University of Calcutta, India; M.A.S. 1982, University of Toronto, Canada; Ph.D. 1986, University of Michigan

**Linda St. Germain, Clinical Instructor in Art Therapy**

B.A. 1965, American University; M.A. 1976, George Washington University

**Linda Bradley Salamon, Professor of English; Dean of Columbian College and Graduate School of Arts and Sciences**

B.A. 1963, Radcliffe College; M.A. 1964, Ph.D. 1971, Bryn Mawr College

**Pedro P. Sanchez, Associate Professor of Management Science**

B.S. 1976, B.Tech. 1979, University of Florida; Ph.D. 1972, University of Michigan

**Burton Malcolm Sapin, Professor of Political Science and International Affairs**

B.A. 1945, M.A. 1947, Columbia University; Ph.D. 1953, Princeton University

**James William Sargent, Assistant Professorial Lecturer in Engineering**

B.S. 1982, Cornell University; M.S. 1987, George Washington University

**Shahram Sarkani, Associate Professor of Civil Engineering**

B.S. 1981, M.S. 1981, Louisiana State University; Ph.D. 1987, Rice University

**Marshall Sashkin, Professorial Lecturer in Psychology**

B.A. 1966, University of California, Los Angeles; Ph.D. 1970, University of Michigan

**John Saunders, Assistant Professorial Lecturer in Administrative Sciences**

B.S. 1971, Pennsylvania State University; M.B.A. 1983, George Washington University

**Gail Savage, Assistant Professor of History**

B.A. 1969, M.A. 1973, Ph.D. 1977, University of Texas

**Donna Scarboro, Adjunct Assistant Professor of English; Director of Summer Sessions and Experimental Programs**

B.A. 1976, Guilford College; M.A. 1982, Ph.D. 1989, Emory University

**William L. Scarpetti, Assistant Clinical Professor of Psychology**

B.A. 1966, Fairfield University; M.S. 1970, Ph.D. 1972, Florida State University

**Judy D'Amico Schafer, Associate Professorial Lecturer in Speech and Hearing**

B.A. 1972, M.A. 1973, Loyola College; Ph.D. 1979, University of Maryland; J.D. 1986, Georgetown University

**Kenneth F. Schaffner, University Professor of Medical Humanities and Professor of Philosophy**

B.S. 1961, City University of New York, Brooklyn College; Ph.D. 1967, Columbia University; M.D. 1986, University of Pittsburgh



- Anita Louise Schamber, *Visiting Assistant Professor of Human Resource Development*  
Ed.D. 1989, Vanderbilt University
- James Hermon Scharen-Guivel, *Professorial Lecturer in Engineering*  
Ph.D. 1966, Cambridge University; M.S. 1972, Purdue University
- Charles Frank Scheffey, *Adjunct Professor of Engineering*  
B.S.C.E. 1943, Drexel University; M.S.C.E. 1951, University of California, Berkeley; D.Sc. 1984, George Washington University
- Fritz Scheuren, *Professorial Lecturer in Statistics*  
B.A. 1963, Tufts University; Ph.D. 1972, George Washington University
- Stefan Otto Schiff, *Professor of Zoology and of Genetics*  
B.S. 1952, Roanoke College; Ph.D. 1964, University of Tennessee, Knoxville
- Richard Harold Schlagel, *Elton Professor of Philosophy*  
B.S. 1949, Springfield College; M.A. 1952, Ph.D. 1955, Boston University
- Jeffrey Schlom, *Adjunct Professor of Genetics*  
B.S. 1963, Ohio State University; M.S. 1966, Adelphi University; Ph.D. 1969, Rutgers University
- Kurt James Schmucker, *Assistant Professorial Lecturer in Engineering*  
B.S. 1973, M.S. 1974, Michigan State University; M.S. 1977, Johns Hopkins University
- Allan Schneider, *Adjunct Professor of Engineering*  
B.S. in E.E. 1959, B.S.E.P. 1960, Lehigh University; M.S. in E.E. 1962, Columbia University; Ph.D. 1974, University of Maryland
- John R. Schoneboom, *Adjunct Instructor in Exercise Science and Tourism Studies*  
B.A. 1988, Hampshire College
- Carol Taylor Schrader, *Adjunct Assistant Professor of Teacher Education*  
B.S. 1958, M.Ed. 1961, University of Nebraska
- Evelyn Jaffee Schreiber, *Adjunct Assistant Professor in English*  
B.A. 1970, Simmons College; M.A. 1971, Colorado State University; Ph.D. 1977, University of Colorado
- Stuart Alan Schulman, *Adjunct Instructor in Travel and Tourism*  
B.B.A. 1962, City University of New York, City College; M.B.A. 1970, New York University; Ed.D. 1988, George Washington University
- John M. Schumpert, *Professorial Lecturer in Engineering*  
B.S. 1961, Clemson University; M.S. 1965, Ph.D. 1967, Northwestern University
- David R. Schwandt, *Associate Professor of Human Resource Development*  
B.S. 1967, Eastern Michigan University; M.A. 1969, Western Michigan University; Ph.D. 1978, Wayne State University
- Arnold Melvin Schwartz, *Associate Professor of Pathology*  
B.A. 1967, City University of New York, Queens College; Ph.D. 1973, Massachusetts Institute of Technology; M.D. 1978, University of Miami
- Gail Schwartz, *Adjunct Assistant Professor of Special Education*  
B.S. 1970, Ohio State University; M.A. 1983, Ed.D. 1989, George Washington University
- Lois Green Schwoerer, *Elmer Louis Kayser Professor of History*  
B.A. 1949, Smith College; M.A. 1952, Ph.D. 1956, Bryn Mawr College
- Richard Samuel Scotti, *Associate Professor of Engineering Management*  
B.S. 1963, Drexel University; M.S. 1964, Ph.D. 1969, University of California, Berkeley
- William E. Seale, *Professor of Finance*  
B.A. 1963, M.S. 1969, Ph.D. 1975, University of Kentucky
- Ormond Albert Seavey, *Professor of English*  
B.A. 1966, Carleton College; M.A. 1967, Ph.D. 1976, Columbia University
- Frank William Segel, *Professor of Accountancy*  
B.S. 1959, Johns Hopkins University; M.B.A. 1964, M.Phil. 1971, Ph.D. 1972, George Washington University
- Susan Kathleen Sell, *Assistant Professor of Political Science*  
B.A. 1979, Colorado College; M.A. 1980, Ph.D. 1989, University of California, Santa Barbara
- Hikmet Senay, *Assistant Professor of Engineering and Applied Science*  
B.S. 1979, Istanbul Technical University, Turkey; M.S. 1982, M.S. 1986, Ph.D. 1987, Syracuse University
- Joseph John Seppy, *Associate Professorial Lecturer in Engineering*  
B.E. 1973, Villanova University; M.S. 1981, George Washington University
- Muhammed Tariq Shams, *Associate Professorial Lecturer in Physics*  
B.S. 1972, Ph.D. 1978, George Washington University
- Wayne C. Shanks, *Associate Professorial Lecturer in Geology*  
B.S. 1969, Michigan State University; M.S. 1971, Louisiana State University; Ph.D. 1976, University of Southern California

- James Campbell Sharf, Professorial Lecturer in Administrative Sciences**  
B.S. 1965, Dickinson College; Ph.D. 1970, University of Tennessee
- Lana O. Shekim, Assistant Clinical Professor of Speech and Hearing**  
B.A. 1975, M.A. 1976, University of Missouri; Ph.D. 1983, University of Florida
- Debra R. Sheldon, Professor of Accountancy**  
B.A. 1969, Northwestern University; M.B.A. 1974, Drexel University; D.B.A. 1981, George Washington University
- Robert Steven Sheldon, Professorial Lecturer in Engineering**  
B.S. 1976, M.S. 1977, University of Minnesota; Ph.D. 1986, Cornell University
- Natalie K. Shemonsky, Associate Professorial Lecturer in Forensic Sciences**  
M.D. 1971, Women's Medical College of Philadelphia; J.D. 1984, University of South Dakota
- Yin-Lin Shen, Assistant Professor of Engineering and Applied Science**  
B.S. 1980, M.S. 1982, National Chiao-Tung University, Taiwan, Ph.D. 1991, University of Wisconsin
- Francis William Shepherd, Associate Professorial Lecturer in Engineering**  
B.S. 1949, City University of New York, City College; M.S. 1950, University of Minnesota, M.E.A. 1960, D.Sc. 1977, George Washington University
- Stanley Newton Sherman, Professor of Business Administration**  
B.A. 1952, M.B.A. 1960, D.B.A. 1977, University of Maryland
- Jane Shore, Associate Professor of English**  
B.A. 1969, Goddard College; M.F.A. 1971, University of Iowa
- Barbara Burns Shostak, Adjunct Assistant Professor of Art Therapy**  
B.A. 1977, Clark University; M.A. 1979, Ph.D. 1990, George Washington University
- Jay R. Shotel, Professor of Special Education**  
B.A. 1967, Ed.M. 1970, Ed.D. 1972, Temple University
- Mark J. Shuart, Assistant Professorial Lecturer in Engineering**  
B.S. 1976, M.S. 1978, Virginia Polytechnic Institute and State University; Ph.D. 1986, University of Delaware
- John Lee Sibert, Associate Professor of Engineering and Applied Science**  
B.A. 1968, Wittenberg University; M.A. 1971, Miami University (Ohio); Ph.D. 1974, University of Michigan
- Herschel Sidransky, Professor of Pathology**  
B.S. 1948, M.D. 1953, M.S. 1958, Tulane University
- Frederic Richard Siegel, Professor of Geochemistry**  
B.A. 1954, Harvard University; M.S. 1958, Ph.D. 1961, University of Kansas
- Carol Kimball Sigelman, Professor of Psychology**  
B.A. 1967, Carleton College; M.A. 1968, Ph.D. 1972, George Peabody College
- Lee Sigelman, Professor of Political Science**  
B.A. 1967, Carleton College; M.A. 1970, Ph.D. 1973, Vanderbilt University
- Gaston Sigur, Distinguished Professor of East Asian Studies**  
B.A. 1947, M.A. 1948, Ph.D. 1957, University of Michigan
- David Elliot Silber, Professor of Psychology**  
B.A. 1958, Wayne State University, M.A. 1960, Ohio University; Ph.D. 1965, University of Michigan
- Sylvia Silver, Associate Professor of Pathology and of Health Care Sciences**  
B.A. 1965, Drake University; M.T.S. 1975, D.A. 1977, Catholic University of America
- Barry George Silverman, Professor of Engineering Management**  
B.S.E. 1975, M.S.E. 1977, Ph.D. 1977, University of Pennsylvania
- Joseph Robert Silverman, Adjunct Professor of Engineering**  
B.S. in E.E. 1959, Northeastern University; M.S. 1968, D.Sc. 1977, George Washington University
- Rodica Simion, Associate Professor of Mathematics**  
B.S. 1974, University of Bucharest, Romania; M.S. 1977, Ph.D. 1981, University of Pennsylvania
- James E. Sims, Professorial Lecturer in Museum Studies**  
B.A. 1967, University of California, Riverside; M.A. 1969, M.F.A. 1973, University of California, Davis
- Larry G. Singleton, Associate Professor of Accountancy**  
B.S. 1978, M.S. 1980, Ph.D. 1985, Louisiana State University
- Nozer Darabsha Singpurwalla, Professor of Operations Research and of Statistics**  
B.S. 1959, B.V. Bhoomreddi College of Engineering and Technology, India; M.S.(I.E.) 1964, Rutgers University; Ph.D. 1968, New York University
- Earl Franklin Skelton, Professorial Lecturer in Engineering**  
B.S. 1962, Fairleigh Dickinson University, Ph.D. 1967, Rensselaer Polytechnic Institute



- Frank James Slaby, Associate Professor of Anatomy**  
B.S. 1965, California Institute of Technology; Ph.D. 1971, University of California, Berkeley
- Arthur Hall Smith, Professor of Painting**  
B.F.A. 1951, Illinois Wesleyan University; M.F.A. 1979, George Washington University
- David Russell Smith, Professorial Lecturer in Engineering**  
B.S. 1967, Randolph-Macon College; M.S.(E.E.) 1970, Georgia Institute of Technology; D.Sc. 1977, George Washington University
- Keith E. Smith, Associate Professor of Accountancy**  
B.A. 1970, University of Pennsylvania; J.D. 1976, LL.M. 1978, University of Florida
- Peter Plympton Smith, Professor of Education; Dean of the School of Education and Human Development**  
B.A. 1968, Princeton University; M.A.T. 1970, Ed.D. 1984, Harvard University
- Robert McClure Smith, Instructor in English**  
B.A. 1984, University of Strathclyde, Scotland; M.A. 1989, Ph.D. 1992, University of Massachusetts
- Stephen Charles Smith, Associate Professor of Economics**  
B.A. 1976, Goddard College; M.A. 1981, Ph.D. 1983, Cornell University
- Robert T. Smythe, Professor of Statistics**  
B.A. 1963, Oberlin College; B.A. 1965, Oxford University; Ph.D. 1969, Stanford University
- Barbara Sobol, Adjunct Assistant Professor of Art Therapy**  
B.A. 1959, Wellesley College; M.A. 1980, George Washington University
- Michael Joseph Sodaro, Professor of Political Science and International Affairs**  
B.A. 1967, Fordham University; M.A. 1970, Johns Hopkins University; Ph.D. 1978, Columbia University
- Richard Martin Soland, Professor of Operations Research; Acting Associate Dean of the School of Engineering and Applied Science**  
B.E.E. 1961, Rensselaer Polytechnic Institute; Ph.D. 1964, Massachusetts Institute of Technology; P.E.
- Steven John Soldin, Professor of Pediatrics, of Pathology, and of Pharmacology**  
B.Sc. 1962, M.Sc. 1965, Ph.D. 1968, University of Witwatersrand South Africa
- Aileen M. Soloman, Adjunct Instructor in Teacher Preparation and Special Education**  
B.A. 1963, City University of New York, Queens College; M.A. 1982, George Washington University
- Elinor Harris Solomon, Adjunct Professor of Economics**  
B.A. 1944, Mount Holyoke College; M.A. 1945, Ph.D. 1948, Harvard University
- Henry Solomon, Professor of Economics**  
B.A. 1949, City University of New York, Brooklyn College; M.A. 1950, Ph.D. 1959, New York University
- Margaret Rapp Soltan, Associate Professor of English**  
B.A. 1977, Northwestern University; M.A. 1978, Ph.D. 1986, University of Chicago
- Richard McKellar Fairfax Southby, Gordon A. Friesen Professor of International Health and Health Policy; Professor of Health Care Sciences**  
B.Com. 1965, University of Melbourne; M.P.A. 1967, Cornell University; Ph.D. 1973, Monash University, Australia
- Refik Soyer, Associate Professor of Management Science**  
B.A. 1978, Bogazici University, Turkey; M.Sc. 1979, University of Sussex, England; D.Sc. 1985, George Washington University
- Ronald H. Spector, Professor of History and of International Affairs**  
B.A. 1964, Johns Hopkins University; M.A. 1966, Ph.D. 1967, Yale University
- James R. Spencer, Jr., Assistant Professorial Lecturer in Art**  
B.S. 1967, Texas A&M University; M.F.A. 1981, George Washington University
- Stephanie M. Spernak, Associate Professorial Lecturer in Health Law**  
B.S. 1971, University of Pittsburgh; M.A. 1978, University of Maryland; J.D. 1981, Georgetown University Law Center
- Paul Eppley Spiegler, Associate Professorial Lecturer in Biological Sciences**  
B.S. 1956, University of Maryland; M.A. 1959, George Washington University
- Philip Daniel Spiess II, Assistant Professorial Lecturer in Museum Studies**  
B.A. 1968, Hanover College; M.A. 1970, University of Delaware; M.A. 1972, Indiana University
- Sheryl Marie Spivack, Instructor in Tourism Studies**  
B.F.A. 1968, Drake University; M.A. in Ed.&H.D. 1987, George Washington University
- Claire B. Sponsler, Assistant Professor of English**  
B.A. 1976, M.A. 1978, University of Cincinnati; Ph.D. 1988, Indiana University

- James Alan Sprague, Professorial Lecturer in Engineering**  
B.A. 1965, B.S. 1966, Ph.D. 1970, Rice University
- Doris Srinivasan, Associate Professorial Lecturer in Art**  
B.A. 1960, City University of New York, Hunter College, Ph.D. 1967, University of Pennsylvania
- Rajagopalan Srinivasan, Professorial Lecturer in Engineering**  
B.Sc. 1980, M.A. 1981, M.Phil. 1979, University of Madras, India; M.S. 1981, Florida State University; Ph.D. 1985, University of Georgia
- Daniel Jean Stanley, Research Professor of Geology**  
B.S. 1956, Cornell University; M.S. 1958, Brown University; D.Sc. 1961, University of Grenoble, France
- Carol Buchalter Stapp, Assistant Professor of Education**  
B.A. 1967, Tulane University; M.A. 1970, University of Pennsylvania; Ph.D. 1990, George Washington University
- Mark Starik, Assistant Professor of Business Administration**  
B.A. 1976, M.A. 1978, University of Wisconsin; Ph.D. 1990, University of Georgia
- James Edward Starrs, Professor of Law and of Forensic Sciences**  
B.A., LL.B. 1958, St. John's University (New York); LL.M. 1959, New York University
- Kathleen Anderson Steeves, Assistant Professor of Secondary Education**  
B.A. 1965, Alma College, M.A.T. 1973, University of Massachusetts, Ph.D. 1987, George Washington University
- Henry Malcolm Steiner, Professor of Engineering Management**  
B.A. in M.E. 1944, M.S. in C.E. 1950, Ph.D. 1965, Stanford University
- Christopher Willie Sten, Professor of English**  
M.A. 1966, Carleton College; M.A. 1968, Ph.D. 1971, Indiana University
- Jeffrey L. Stephanic, Associate Professor of Photography**  
B.A. 1977, M.F.A. 1980, George Washington University
- George Christopher Stephens, Professor of Geology**  
B.S. 1967, M.S. 1969, George Washington University, Ph.D. 1972, Lehigh University
- Richard Walton Stephens, Professor of Sociology**  
B.A. 1951, Franklin and Marshall College; M.A. 1953, Ph.D. 1956, University of North Carolina
- Christopher H. Sterling, Professor of Communication**  
B.S. 1965, M.S. 1967, Ph.D. 1969, University of Wisconsin
- Arthur Marvin Stern, Professorial Lecturer in Engineering**  
B.S. 1947, M.S. 1948, Ph.D. 1951, University of Illinois
- Bradley R. Stevens, Assistant Professorial Lecturer in Art**  
B.F.A. 1976, M.F.A. 1979, George Washington University
- Robert Gene Stevens, Visiting Professor of Accountancy**  
B.S. 1951, Southern Illinois University, M.S. 1953, Ph.D. 1958, University of Illinois
- Clayton Verne Stewart, Associate Professorial Lecturer in Engineering**  
B.S. 1973, University of Redlands, M.S. 1975, Ph.D. 1978, Air Force Institute of Technology
- Robert P. Stoker, Associate Professor of Political Science**  
B.A. 1976, Ohio State University, M.A. 1979, Ph.D. 1983, University of Maryland
- Gerald Virgil Stokes, Associate Professor of Microbiology and Immunology**  
B.A. 1967, Southern Illinois University; Ph.D. 1973, University of Chicago
- Stephen Stollmack, Professorial Lecturer in Engineering**  
B.S. 1956, Rensselaer Polytechnic Institute, M.S. 1965, Ph.D. 1969, Ohio State University
- Eugene Almon Stone, Associate Professor of Mathematics**  
B.A. 1960, Vanderbilt University; Ph.D. 1966, University of Virginia
- Francis Howard Stoodley, Associate Professorial Lecturer in Engineering**  
B.S. 1957, U.S. Naval Academy, B.S.E.E. 1962, Naval Postgraduate School; M.E.A. 1964, Engr. 1969, George Washington University
- Richard Briggs Stott, Associate Professor of History**  
B.A. 1970, Ph.D. 1983, Cornell University
- Robert W. Strand, Associate Professorial Lecturer in Finance**  
B.S. 1974, Davidson College; Ph.D. 1981, University of North Carolina
- James Ashley Straw, Professor of Pharmacology**  
B.S. 1958, Ph.D. 1963, University of Florida
- Sharon Alice Straw, Lecturer in Counseling**  
B.A. 1985, M.A. 1987, George Washington University
- Fate Suber, Jr., Assistant Professorial Lecturer in Engineering**  
B.S. 1976, M.E.A. 1980, George Washington University
- Patricia Ann Sullivan, Assistant Professor of Exercise Science**  
B.S. 1969, State University of New York College at Cortland; M.S. 1973, Smith College; Ed.D. 1989, George Washington University



- Steven M. Suranovic, Assistant Professor of Economics**  
B.S. 1982, University of Illinois; M.A. 1986, Ph.D. 1989, Cornell University
- Ellen Moore Suthers, Adjunct Assistant Professor of Anthropology**  
B.A. 1973, Randolph-Macon Woman's College; M.A. 1977, Ph.D. 1987, University of Virginia
- John F. Sutter, Associate Professorial Lecturer in Geology**  
B.S. 1965, Capital University; M.A. 1968, Ph.D. 1970, Rice University
- P.A.V.B. Swamy, Adjunct Professor of Economics**  
M.A. 1957, M.S. 1958, Andhra University, India; Ph.D. 1968, University of Wisconsin
- Robert W. Swezey, Professorial Lecturer in Psychology**  
B.A. 1965, Grove City College; M.A. 1967, American University; Ph.D. 1972, University of Maryland
- Paul Michael Swiercz, Associate Professor of Management Science**  
M.P.H. 1976, University of Michigan; M.S. 1981, Ph.D. 1984, Virginia Polytechnic Institute and State University
- Lynne Taetzsch, Instructor in English**  
B.A. 1971, Rutgers University; M.A. 1988, San Diego State University; Ph.D. 1992, Florida State University
- Nematollah Taghavi, Assistant Professor of Mathematics**  
B.S. 1975, University of Maryland; M.A. 1983, American University
- Lucretia D. Tanner, Associate Professorial Lecturer in Administrative Sciences**  
B.S. 1962, University of Connecticut; M.S. 1964, University of Wisconsin
- Morton Frank Taragin, Associate Professor of Physics**  
B.S. in Engr. 1965, M.Phil. 1969, Ph.D. 1970, George Washington University
- Robert Morris Tarakan, Assistant Professorial Lecturer in Engineering**  
B.S. 1977, Rensselaer Polytechnic Institute; M.S. 1981, George Washington University
- K. Vanita Tarpley, Clinical Instructor in Art Therapy**  
B.A. 1981, Towson State University; M.A. 1984, George Washington University
- Claudia Tate, Professor of English**  
B.A. 1968, University of Michigan; M.A. 1971, Ph.D. 1977, Harvard University
- Juliana M. Taymans, Associate Professor of Special Education**  
B.A. 1972, Ph.D. 1985, University of Maryland; M.A. 1976, George Washington University
- Robert Frederick Teitel, Associate Professorial Lecturer in Statistics**  
B.A. 1966, City University of New York, City College
- Douglas Harold Teller, Professor of Design and Graphics**  
B.A. 1956, Western Michigan University; M.F.A. 1962, George Washington University
- Bradford Lewis Thomas, Professorial Lecturer in Geography and Regional Science**  
B.A. 1953, Washington University; M.A. 1958, University of Kansas
- James L. Thomas, Professorial Lecturer in Engineering**  
B.S. 1975, Virginia Polytechnic Institute and State University; M.S. 1980, George Washington University; Ph.D. 1983, Mississippi State University
- Terry Lynn Duel Thomas, Associate Professorial Lecturer in Environmental Science**  
B.A. 1970, University of Colorado; M.S. 1977, Georgetown University; Ph.D. 1986, Johns Hopkins University
- Desmond Edwin Thompson, Assistant Research Professor of Statistics**  
B.Sc. 1967, University of the West Indies; M.Sc. 1970, University of British Columbia; Ph.D. 1985, University of Washington
- Richard Thornton, Professor of History and International Affairs**  
B.A. 1961, Colgate University; Ph.D. 1966, University of Washington
- James B. Thurman, Associate Professor of Business Administration**  
B.A. 1966, M.B.A. 1972, Ph.D. 1978, Pennsylvania State University
- Mary Elizabeth Tidball, Professor of Physiology**  
B.A. 1951, L.H.D. 1976, Mount Holyoke College; M.S. 1955, Ph.D. 1959, University of Wisconsin; Sc.D. 1973, Wilson College; D.Sc. 1974, Trinity College (District of Columbia); H.H.D. 1977, St. Mary's College (Indiana); D.Sc. 1977, Cedar Crest College; D.Sc. 1978, The University of the South; D.Sc. 1979, Goucher College; Litt.D. 1980, Regis College; Litt.D. 1980, College of Saint Catherine; H.H.D. 1982, Hood College; LL.D. 1983, Saint Joseph College; L.H.D. 1984, Skidmore College; L.H.D. 1985, Marymount College; L.H.D. 1985, Converse College; D.Sc. 1986, Saint Mary-of-the-Woods College; L.H.D. 1986, Mount Vernon College; D.Litt. 1989, Alverno College; M.T.S. 1990, Wesley Theological Seminary
- Samuel Coakley Tignor, Professorial Lecturer in Engineering**  
B.S.C.E. 1958, Virginia Polytechnic Institute and State University; M.C.E. 1966, Catholic University of America; M.S.E. 1970, Ph.D. 1974, University of Michigan

**George Tilson, Adjunct Assistant Professor of Special Education**

B.A. 1976, Trinity University; M.A. in Ed&H.D. 1982, Ed.D. 1986, George Washington University

**Robert Yen-ying Ting, Associate Professorial Lecturer in Engineering**

B.S. 1964, National Taiwan University; M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1971, University of California, San Diego

**George Todaro, Adjunct Professor of Genetics**

B.A. 1958, Swarthmore College; M.D. 1963, New York University

**Charles Nelson Toftoy, Associate Professor of Management Science**

B.S. 1958, U.S. Military Academy; M.B.A. 1969, Tulane University; D.B.A. 1985, Nova University

**Susan J. Tolchin, Professor of Public Administration**

B.A. 1961, Bryn Mawr College; M.A. 1962, University of Chicago; Ph.D. 1968, New York University

**Richard Paul Tollo, Assistant Professor of Geology**

B.A. 1972, Tufts University; M.S. 1976, University of New Hampshire; Ph.D. 1982, University of Massachusetts

**Robert Heath Tolson, Research Professor of Engineering and Applied Science**

B.S. 1958, M.S. 1963, Virginia Polytechnic Institute and State University; Ph.D. 1990, Old Dominion University

**Blaza Toman, Assistant Professor of Statistics**

B.S. 1975, Wright State University; M.S. 1977, State University of New York at Buffalo; Ph.D. 1987, Ohio State University

**Christopher Mark Toppe, Associate Professorial Lecturer in Statistics**

B.Ed. 1970, M.Ed. 1971, Ph.D. 1978, University of Florida

**Hossein Torabi, Adjunct Professor of Education**

B.S. 1958, M.A. 1969, Tehran University; Ed.D. 1979, George Washington University

**Theodore George Toridis, Professor of Engineering and Applied Science**

B.S. 1954, Robert College, Turkey; M.S. 1961, Ph.D. 1964, Michigan State University

**Stephen Joel Trachtenberg, Professor of Public Administration; President of the University**

B.A. 1959, Columbia University; J.D. 1962, Yale University; M.P.A. 1966, Harvard University; L.H.D. 1986, Trinity College (Connecticut); LL.D. 1990, Hanyang University, Korea

**Leon W. Transeau, Professorial Lecturer in Engineering**

B.I.E. 1959, Georgia Institute of Technology; M.B.A. 1963, University of Delaware; Ph.D. 1968, American University

**Carl Augustus Troester, Jr., Adjunct Professor of Exercise Science and Tourism Studies**

B.S. 1937, Northeast Missouri State University; M.A. 1938, University of Missouri; Ed.D. 1942, Columbia University

**Joseph Louis Tropea, Associate Professor of Sociology**

B.A. 1962, Wayne State University; M.A. 1965, Michigan State University; Ph.D. 1973, George Washington University

**Robert P. Trost, Professor of Economics**

B.M.E. 1969, University of Detroit; Ph.D. 1977, University of Florida

**Jodi Elizabeth Tryon, Assistant Professorial Lecturer in Engineering**

B.A. 1972, California State University; M.S. 1983, Naval Postgraduate School; App.Sc. 1988, D.Sc. 1990, George Washington University

**Steven A. Tuch, Associate Professor of Sociology**

B.A. 1973, University of Massachusetts; M.A. 1976, Emory University; Ph.D. 1981, Pennsylvania State University

**Virginia M. Turner, Adjunct Assistant Professor of Parasitology in Microbiology and Immunology**

B.S. 1960, Towson State University

**William Douglas Tynan, Jr., Assistant Clinical Professor of Psychology**

B.A. 1974, Boston University; M.S. 1978, University of Connecticut; Ph.D. 1983, State University of New York at Binghamton

**Douglas Henry Ubelaker, Professorial Lecturer in Anthropology**

B.A. 1968, Ph.D. 1973, University of Kansas

**Daniel H. Ullman, Associate Professor of Mathematics**

B.A. 1979, Harvard University; Ph.D. 1985, University of California, Berkeley

**Stuart A. Umpleby, Professor of Management Science**

B.S., B.A. 1967, M.A. 1969, Ph.D. 1975, University of Illinois

**Joan B. Urban, Professorial Lecturer in International Affairs and History**

B.A. 1956, Northwestern University; M.A. 1959, Ph.D. 1967, Harvard University

**Peter B. Vaill, Professor of Human Systems**

B.A. 1958, University of Minnesota; M.B.A. 1960, D.B.A. 1964, Harvard University



- John Alexander Valentine, Visiting Assistant Professor of Health Services Management and Policy**  
B.A. 1966, Capital University; M.S.W. 1969, M.P.H. 1979, University of Pittsburgh; Ph.D. 1989, University of Pennsylvania
- Jack Yehudi Vanderhoek, Associate Professor of Biochemistry and Molecular Biology**  
B.S. 1960, City University of New York, City College; Ph.D. 1966, Massachusetts Institute of Technology
- A. Hale Vandermer, Adjunct Professor of Environmental Science**
- William Adolphus Van Dyke, Jr., Assistant Professorial Lecturer in Engineering**  
B.S. 1958, Texas State University; M.E.A. 1984, D.Sc. 1990, George Washington University
- Emanuel Vegh, Professorial Lecturer in Mathematics**  
B.A., M.A. 1960, University of Delaware; Ph.D. 1963, University of North Carolina
- Cherian Verghese, Assistant Clinical Professor of Psychology**  
B.S. 1975, M.A. 1978, Towson State University; Ph.D. 1987, Temple University
- Thomas Verghese, Assistant Professor of Accountancy**  
B.S.E.E. 1970, University of Madras; M.S. 1980, University of Houston; Ph.D. 1988, Columbia University
- Dante Verme, Assistant Research Professor of Statistics**  
B.A. 1973, Universidad del Pacifico, Peru; M.A. 1983, Ph.D. 1990, George Washington University
- Donald Eugene Vermeer, Professor of Geography and Regional Science**  
B.A. 1954, M.A. 1959, Ph.D. 1964, University of California, Berkeley
- Joel I. Verter, Research Professor of Statistics**  
B.S. 1965, City University of New York, City College; M.S. 1967, University of Massachusetts; Ph.D. 1979, University of North Carolina
- Akos Vertes, Associate Professor of Chemistry**  
B.Sc. 1974, M.Sc. 1976, Ph.D. 1979, Eotvos Lorand University, Hungary
- Kanoknart Visudtibhan, Assistant Professor of International Business**  
B.Comm. 1976, University of Western Australia; M.B.A. 1978, University of New South Wales, Australia; Ph.D. 1988, University of Pennsylvania
- Arthur Viterito, Assistant Professor of Geography and Regional Science**  
B.A. 1973, Long Island University; M.A. 1976, State University of New York at Albany; Ph.D. 1980, University of Denver
- John Michael Vlach, Professor of American Civilization**  
B.A. 1970, University of California, Davis; M.A. 1972, Ph.D. 1975, Indiana University
- Branimir Radovan Vojcic, Assistant Professor of Engineering and Applied Science**  
Dipl. Eng. 1980, M.S. 1986, D.Sc. 1989, University of Belgrade, Yugoslavia
- James W. Volkert, Assistant Professorial Lecturer in Museum Studies**  
B.A. 1970, University of California, Davis; M.F.A. 1977, Art Center College of Design
- Barbara Ann von Barghahn-Calvetti, Professor of Art**  
B.A. 1970, University of Iowa; M.A. 1972, Ph.D. 1979, New York University
- Ernst Theodore von Briesen, Assistant Professorial Lecturer in Engineering**  
B.A. 1965, Harvard University
- Nicholas S. Vonortas, Assistant Professor of Economics and International Affairs**  
B.A. 1981, University of Athens, Greece; M.A. 1982, University of Leicester, England; M.Phil. 1987, Ph.D. 1989, New York University
- Clemmont Eyvind Vontress, Professor of Counseling**  
B.A. 1952, Kentucky State College; M.S. 1956, Ph.D. 1965, Indiana University
- Anne L. Vopatek, Assistant Professorial Lecturer in Engineering**  
B.S. 1980, Carnegie-Mellon University; M.S. 1983, D.Sc. 1992, George Washington University
- Alan Gerard Wade, Professor of Theatre**  
B.A. 1968, Ph.D. 1981, Northwestern University; M.A. 1972, Catholic University of America
- Charles Matthew Waespy, Associate Professorial Lecturer in Engineering**  
B.S. 1951, U.S. Naval Academy; M.S. 1954, Massachusetts Institute of Technology; Ph.D. 1967, University of California, Los Angeles; M.B.A. 1978, Loyola College (Maryland)
- Donald K. Wagner, Professorial Lecturer in Engineering**  
B.S. 1978, University of Wisconsin; M.S. 1980, Ph.D. 1983, Northwestern University
- June Avers Wagner, Adjunct Instructor in Teacher Education**  
B.A. 1949, Wells College; M.Ed. 1976, William Paterson College of New Jersey
- Pradeep Kumar Wahi, Associate Professorial Lecturer in Engineering**  
B.Tech. 1972, M.Tech. 1976, Indian Institute of Technology, India; M.S. 1978, State University of New York at Stony Brook

- Eugene Allen Walker, Assistant Professorial Lecturer in Engineering**  
B.S. 1966, University of Maine; M.S. 1972, George Washington University
- Robert Harris Walker, Jr., Professor of American Civilization**  
B.S. 1945, Northwestern University; M.A. 1950, Columbia University; Ph.D. 1955, University of Pennsylvania
- Dewey Diaz Wallace, Jr., Professor of Religion**  
B.A. 1957, Whitworth College; B.D. 1960, Princeton Theological Seminary; M.A. 1962, Ph.D. 1965, Princeton University
- Ruth Ann Wallace, Professor of Sociology**  
B.A. 1961, Immaculate Heart College; M.A. 1963, University of Notre Dame; Ph.D. 1968, University of California, Berkeley
- Tara Ghoshal Wallace, Assistant Professor of English**  
B.A. 1973, Bryn Mawr College; M.A. 1975, Ph.D. 1981, University of Toronto
- William C. Wallace, Adjunct Assistant Professor of Genetics**  
B.S. 1976, University of Maryland; Ph.D. 1980, Case Western Reserve University
- John D. Waller, Professorial Lecturer in Engineering**  
B.S. 1959, Rockhurst College; M.S. 1962, Ph.D. 1966, University of Notre Dame
- Michel B. Wallerstein, Adjunct Associate Professor of International Affairs and Political Science**  
B.A. 1971, Dartmouth College; M.P.A. 1972, Syracuse University; Ph.D. 1978, Massachusetts Institute of Technology
- Raymond John Walsh, Professor of Anatomy**  
B.S. 1969, University of Massachusetts; Ph.D. 1978, Tufts University
- Ruth T. Walton, Clinical Instructor in Speech and Hearing**  
B.A. 1960, Greensboro College; M.S. 1975, George Washington University
- Todd Leon Walton, Jr., Assistant Professorial Lecturer in Engineering**  
B.S. 1970, University of Cincinnati; M.S. 1972, Ph.D. 1979, University of Florida
- Stephen Michael Wander, Associate Professorial Lecturer in Engineering**  
B.M.E. 1968, Ohio State University; M.E.A. 1980, George Washington University
- Chai-Ho Charles Wang, Professorial Lecturer in Engineering**  
B.A. 1964, Fort Lewis College; M.A. 1968, University of Washington; Ph.D. 1974, University of Denver
- Andrew B. Wardlaw, Jr., Associate Professorial Lecturer in Engineering**  
B.S. 1967, Bucknell University; M.S. 1968, Ph.D. 1971, University of Pennsylvania
- Christopher Walden Warner, Adjunct Instructor in Exercise Science and Tourism Studies**  
B.A. 1972, Williams College; I.D. 1976, University of Miami; M.S. 1982, American University
- Edward L. Warner III, Adjunct Professor of International Affairs and Political Science**  
B.S. 1962, U.S. Naval Academy; M.A. 1967, Ph.D. 1975, Princeton University
- Clay Warren, Chauncey M. Depew Professor of Communication**  
B.S. 1968, U.S. Naval Academy; M.A. 1973, Ph.D. 1976, University of Colorado
- Wilcomb Edward Washburn, Professorial Lecturer in American Civilization**  
B.A. 1948, Dartmouth College; Ph.D. 1955, Harvard University
- Wasył Wasyłkiwskyj, Professor of Engineering and Applied Science**  
B.E.E. 1957, City University of New York, City College; M.S. in E.E. 1965, Ph.D. 1968, Polytechnic University
- Robert Charles Waters, Professor of Engineering Management**  
B.S. 1956, M.B.A. 1963, University of California, Los Angeles; D.B.A. 1968, University of Southern California
- Don Wayne Watkins, Associate Professor of Physiology**  
B.Ch.E. 1963, University of Louisville; Ph.D. 1968, University of Wisconsin
- Harry S. Watson, Professor of Economics**  
B.A. 1971, Ph.D. 1981, Indiana University
- William Allan Webb, Assistant Professorial Lecturer in Engineering**  
B.S. 1966, University of Miami; M.S. 1968, Florida Institute of Technology; P.E. 1978, Ph.D. 1984, University of California
- Ann Gordon Webster, Lecturer in Anthropology**  
B.A. 1950, Wellesley College; M.A. 1979, George Washington University
- William Bernard Weglicki, Professor of Medicine and of Physiology**  
M.D. 1962, University of Maryland
- Stephen B. Wehrenberg, Associate Professorial Lecturer in Administrative Sciences**  
B.S.E.E. 1978, M.A. 1979, Ph.D. 1981, Columbia Pacific University



**Gail D. Weiss, Assistant Professor of Philosophy**

B.A. 1981, Denison University; M.A. 1982, Ph.D. 1991, Yale University

**Ronald Weitzer, Associate Professor of Sociology**

B.A. 1975, University of California, Santa Cruz; M.A. 1978, Ph.D. 1985, University of California, Berkeley

**Marilyn Teeter Welles, Assistant Professorial Lecturer**

B.A. 1957, Albright College; M.S. 1982, D.Sc. 1990, George Washington University

**Elizabeth Fortson Wells, Assistant Professor of Botany**

B.A. 1965, Agnes Scott College; M.A. 1970, Ph.D. 1977, University of North Carolina

**William Gaynor Wells, Jr., Associate Professor of Management Science**

B.S. 1947, University of Chicago; M.S. 1961, Purdue University; D.B.A. 1977, George Washington University

**Linda Louise Werling, Assistant Professor of Pharmacology**

B.S. 1976, Indiana University; Ph.D. 1983, Duke University

**Barry Ward Wessels, Professor of Radiology**

B.S. 1969, Rensselaer Polytechnic Institute; Ph.D. 1975, University of Notre Dame

**Lynda L. West, Professor of Special Education**

B.A. 1968, Benedictine College; M.D. 1976, Ph.D. 1979, University of Missouri

**Beverly Jean Westerman, Adjunct Instructor in Exercise Science and Tourism Studies**

B.S. 1981, Western Kentucky University; M.Ed. 1983, University of Virginia

**Robert Paul Weston, Assistant Professorial Lecturer in Engineering**

B.S. 1972, M.S. 1974, Ph.D. 1981, University of Florida

**Benjamin Whang, Adjunct Professor of Engineering**

B.C.E. 1959, M.C.E. 1961, Polytechnic University; Ph.D. 1968, Massachusetts Institute of Technology

**Nancy Winegardner Whichard, Instructor in English**

B.A. 1967, Purdue University; M.A. 1971, University of Georgia

**David Gover White, Professor of Chemistry**

B.Ch.E. 1950, Cornell University; Ph.D. 1954, Harvard University

**Elizabeth White, Clinical Instructor in Art Therapy**

B.A. 1979, University of Maryland; M.A. 1986, George Washington University

**John Lindsey Whitesides, Jr., Professor of Engineering and Applied Science**

B.S. 1965, Ph.D. 1968, University of Texas

**Fred Whiton, Jr., Assistant Professorial Lecturer in Engineering**

B.S.M.E. 1983, University of Maryland; M.S.M.E. 1985, Rensselaer Polytechnic Institute; M.E.A. 1988, George Washington University

**Susan Louise Wiley, Assistant Professor of Political Science**

B.S. 1971, Georgia Institute of Technology; Ph.D. 1987, University of Maryland

**David Stanley Wilkinson, Professor of Pathology**

B.S. 1967, Virginia Military Institute; Ph.D. 1971, University of Wisconsin; M.D. 1978, University of Miami

**Susan P. Willens, Assistant Professor of English**

B.A. 1954, University of Michigan; M.A. 1956, Yale University; Ph.D. 1972, Catholic University of America

**Henry I. Willett, Jr., Associate Professor of Education Administration**

B.A. 1952, Washington and Lee University; M.Ed. 1955, Ed.D. 1967, University of Virginia

**Katherine Johnston Williams, Assistant Professor of Art Therapy**

B.A. 1962, University of Wisconsin; M.A. 1977, M.Phil. 1989, Ph.D. 1991, George Washington University

**Frank Leroy Willingham, Jr., Associate Professorial Lecturer in Engineering**

B.S. 1961, University of Florida; M.S. 1976, University of Maryland

**Charles Winklehaus, Associate Professorial Lecturer in Engineering**

B.C.E. 1951, M.C.E. 1957, Polytechnic University; Ph.D. 1970, University of Michigan

**Erik Kenelm Winslow, Professor of Behavioral Sciences**

B.S. 1963, Pennsylvania State University; M.S. 1965, Ph.D. 1967, Case Western Reserve University

**Philip William Wirtz, Professor of Management Science and of Psychology**

B.A. 1971, Ph.D. 1983, George Washington University; M.S. 1974, Purdue University

**Maida Rust Withers, Professor of Dance**

B.A. 1958, Brigham Young University; M.S. 1960, University of Utah

**Ronald W. Witzel, Professorial Lecturer in Engineering**

B.S.E. 1962, U.S. Military Academy; M.S.E. 1966, Purdue University

**Sharon Lee Wolchik, Professor of Political Science and International Affairs**

B.A. 1970, Syracuse University; M.A. 1972, Indiana University; Ph.D. 1978, University of Michigan

**Alfred Abraham Wolf, Professorial Lecturer in Engineering**

B.S.(E.E.) 1948, Drexel University; M.S.(E.E.) 1954, Ph.D. 1958, University of Pennsylvania; Sc.D. 1977, M.D. 1978, University of Iuarez

**Brunetta Reid Wolfman, Professor of Education**

B.A. 1957, M.A. 1968, Ph.D. 1971, University of California, Berkeley; D.H.L. 1983, Boston University; D.Pedagogy 1983, Northeastern University; L.L.D. 1984, Regis College; D.H.L. 1985, Suffolk University; D.Litt. 1985, Stonehill College; D.Engr.Tech (hon) 1985, Wentworth Institute

**William Bruce Wood, Associate Professorial Lecturer in Geography and Regional Science**

B.S. 1980, University of California, Berkeley; M.U.R.P. 1982, Ph.D. 1985, University of Hawaii

**Pamela Jane Woodruff, Lecturer in Psychology**

B.A. 1976, George Washington University

**William Thomas Woodward, Professor of Painting**

B.A. 1957, M.A. 1961, American University

**Michael J. Worth, Professor of Education; Vice President for Development and Alumni Affairs**

B.A. 1968, Wilkes College; M.A. 1970, American University; Ph.D. 1982, University of Maryland

**John Franklin Wright, Jr., Professor of Drawing and Graphics**

B.A. 1954, American University; M.A. 1960, University of Illinois

**John R. Wright, Professor of Political Science**

B.A. 1976, M.A. 1978, Northern Illinois University; M.A. 1981, Ph.D. 1983, University of Rochester

**Jeremy S. Wu, Associate Professorial Lecturer in Statistics**

B.A. 1974, M.A. 1976, Ph.D. 1983, George Washington University

**William W. Wu, Professorial Lecturer in Engineering**

B.S.E.E. 1961, Purdue University; M.S. 1967, Massachusetts Institute of Technology; Ph.D. 1976, Johns Hopkins University

**Lan Xue, Assistant Professor of Engineering Management**

B.E. 1982, Changchun Institute of Optics and Fine Mechanics, People's Republic of China; M.S. 1986, M.S. 1987, State University of New York at Stony Brook; Ph.D. 1991, Carnegie-Mellon University

**Michael Yachnis, Adjunct Professor of Engineering**

B.S. 1943, Military Academy, Greece; M.S. 1956, M.E.A. 1962, D.Sc. 1968, George Washington University

**Susan Yaffe-Oziel, Clinical Instructor in Speech and Hearing**

B.S. 1976, Emerson College; M.M.S. 1978, Emory University

**Harry Elwood Yeide, Jr., Professor of Religion**

B.A. 1953, Williams College; B.D. 1957, Union Theological Seminary; Ph.D. 1966, Harvard University

**Anthony Marvin Yezer, Professor of Economics**

B.S. 1966, Dartmouth College; M.S. 1967, London School of Economics and Political Science; Ph.D. 1974, Massachusetts Institute of Technology

**Richard Yi-chang Yin, Associate Professor of Economics and International Affairs**

L.L.B. 1946, Fu Jen University, China; M.A. 1950, University of Denver; Ph.D. 1966, Columbia University

**Ellen Davis Yorke, Associate Professor of Radiology**

B.A. 1962, Barnard College; M.A. 1963, Columbia University; Ph.D. 1967, University of Maryland

**Mark Arthur Youngren, Assistant Professorial Lecturer in Engineering**

B.S. 1976, Michigan State University; M.S. 1982, University of Northern Colorado; M.S. 1983, Naval Postgraduate School; D.Sc. 1988, George Washington University

**Abdou Youssef, Assistant Professor of Engineering and Applied Science**

B.S. 1981, B.S. 1982, Lebanese University; M.A. 1985, Ph.D. 1988, Princeton University

**Mona Elwakkad Zaghloul, Professor of Engineering and Applied Science**

B.S.(E.E.) 1965, Cairo University, Egypt; M.S.(E.E.) 1970, M.Math. 1971, Ph.D. 1975, University of Waterloo, Canada

**David Laster Zalkind, Associate Professor of Quantitative Methods and Management Information**

B.A. 1967, Harvard University; M.S. 1968, Stanford University; Ph.D. 1972, Johns Hopkins University

**Michele Zavos, Associate Professorial Lecturer in Women's Studies**

B.A. 1974, University of Wisconsin; J.D. 1979, Catholic University of America

**Maria Cecilia Zea, Assistant Professor of Psychology**

Psychologist 1981, Pontificia Universidad Javeriana, Colombia; M.A. 1987, Ph.D. 1990, University of Maryland



- Meira Ellen Zedek, Associate Clinical Professor of Psychology  
B.A. 1953, Hebrew University, Israel; M.A. 1954, Ph.D. 1958, Boston University
- Joseph Zeidner, Professor of Administrative Sciences and of Psychology  
B.S. 1949, City University of New York, City College; M.A. 1951, Fordham University; Ph.D. 1954, Catholic University of America
- Chunmiao Zheng, Assistant Professorial Lecturer in Geology  
B.S. 1983, Chengdu College of Geology, China; Ph.D. 1988, University of Wisconsin
- Arthur Jay Ziffer, Associate Professorial Lecturer in Engineering  
B.S. 1952, City University of New York, Queens College; M.S. 1954, University of Chicago
- Elizabeth Anne Zimmer, Adjunct Associate Professor of Genetics  
B.S. 1973, Cornell University; Ph.D. 1980, University of California, Berkeley
- Jeffrey A. Zinn, Associate Professorial Lecturer in Geography and Regional Science  
B.A. 1967, University of Vermont; M.A. 1970, University of Rhode Island; Ph.D. 1972, Oregon State University
- Bernard Charles Zook, Professor of Pathology (Comparative)  
B.S. 1962, D.V.M. 1963, Colorado State University
- Artley Joseph Zuchelli, Professor of Physics  
B.A. 1955, Ph.D. 1958, University of Virginia

### CONSULTANTS IN RESEARCH—COLUMBIAN COLLEGE AND GRADUATE SCHOOL OF ARTS AND SCIENCES

- Richard Allan Arndt, Assistant to the Director, COMSAT Laboratories; Chemistry  
B.S. 1955, University of Toledo; M.S. 1957, Ph.D. 1961, Northwestern University
- Edward G. Bartick, Research Chemist, Federal Bureau of Investigation; Chemistry  
B.A. 1969, Southern Connecticut State University; Ph.D. 1978, University of Connecticut
- Raymond L. Bernor, Associate Professor of Anatomy, Howard University; Geobiology  
B.A. 1971, M.A. 1973, Ph.D. 1978, University of California, Los Angeles
- Robert M. Blaese, Deputy Chief, Metabolism Branch, National Cancer Institute; Biochemistry  
B.S. 1961, Gustavus Adolphus College; M.D. 1964, University of Minnesota
- Mark L. Brantly, Head, Unit on Genetic Disorders of Secreted Proteins, National Institute of Child Health and Human Development; Genetics  
B.S. 1976, Florida State University; M.D. 1979, University of Florida
- Richard Harvey Brown, Professor of Sociology, University of Maryland; Sociology  
B.A. 1961, University of California, Berkeley; M.A. 1965, Columbia University; Ph.D. 1973, University of California, San Diego
- Arnold R. Bruhn, Arnold R. Bruhn and Associates; Psychology  
B.A. 1963, M.A. 1966, University of Portland; M.S. 1972, Portland State University; Ph.D. 1976, Duke University
- Thomas A. Cebula, Chief, Molecular Biology Branch, Division of Microbiology, Food and Drug Administration; Genetics  
B.S. 1968, Wilkes College; Ph.D. 1973, Johns Hopkins University
- Jerry M. Collins, Senior Scientist, Center for Drug Evaluation and Research, U.S. Food and Drug Administration; Pharmacology  
B.S. 1972, Drexel University; M.S., Ph.D. 1974, University of Pennsylvania
- Benoit de Crombrughe, Haas Professor of Molecular Genetics, University of Texas; Genetics  
M.D. 1961, Universite de Louvain, Belgium
- Lee E. Eiden, Chief, Molecular and Cellular Neurobiology Unit, Laboratory of Cell Biology, National Institute of Mental Health; Genetics  
B.A. 1974, Northwestern University; Ph.D. 1979, University of Kansas
- Ronald LaNay Felsted, Research Chemist, Laboratory of Biological Chemistry, National Cancer Institute; Biochemistry and Molecular Biology  
B.S. 1964, Brigham Young University; Ph.D. 1969, University of California, Davis
- Albert Joseph Fornace, Jr., Senior Investigator, Medical Research Officer, Radiation Oncology Branch, National Cancer Institute; Genetics  
B.S. 1970, Pennsylvania State University; M.D. 1972, Thomas Jefferson University

- Edward I. Ginns, Acting Chief, Clinical Neuroscience Branch, National Institute of Mental Health; Genetics  
B.S. 1967, Ph.D. 1971, Rensselaer Polytechnic Institute; M.D. 1976, Johns Hopkins School of Medicine
- Jordan Grafman, Chief, Cognitive Neuroscience Section, Medical Neurology Branch, National Institute of Neurological Disorders and Stroke; Psychology  
B.A. 1974, Sonoma State University; Ph.D. 1981, University of Wisconsin
- Liana Harvath, Research Microbiologist, Center for Drugs and Biologics, U.S. Food and Drug Administration; Biological Sciences  
B.S. 1973, Michigan State University; Ph.D. 1976, University of Illinois Medical Center, Chicago
- Nikki J. Holbrook, Chief, Unit on Gene Expression and Aging, National Institute on Aging; Genetics  
B.A. 1974, M.A. 1976, Ph.D. 1980, University of South Florida
- Richard Houbrick, Curator, Department of Invertebrate Zoology, National Museum of Natural History; Biological Sciences  
B.A. 1959, St. Bernard College; D.C. 1965, St. Leo Theological Seminary; M.S. 1967, University of Miami; Ph.D. 1971, University of South Florida
- Michael C. Jaye, Principal Scientist, Molecular Biology Division, Rorer Biotechnology Inc.; Genetics  
B.A. 1975, Ph.D. 1981, University of Connecticut
- Stefan Karlsson, Chief, Molecular and Medical Genetics Section, Developmental and Metabolic Neurology Branch, National Institute of Neurological Disease and Stroke; Genetics  
M.D. 1976, University of Iceland; Ph.D. 1982, University College, London
- Jonathan Keller, Scientist, Biological Carcinogenesis Development Program, NCI-Frederick Cancer Research Facility; Genetics  
B.S. 1978, University of Maryland; Ph.D. 1985, George Washington University
- Kathleen Kelly, Expert, Laboratory of Pathology, National Cancer Institute; Microbiology  
B.A. 1974, University of Colorado; Ph.D. 1980, University of California, Irvine
- Jacob V. Maizel, Jr., Chief, Laboratory of Mathematical Biology, National Cancer Institute; Genetics  
B.S. 1955, M.S. 1957, Pennsylvania State University; Ph.D. 1959, California Institute of Technology
- Rodney L. Monroy, Head, Preclinical Studies Branch, and Project Manager, Therapeutic Protocol Development, Naval Medical Research Institute; Microbiology  
B.A. 1970, Humboldt State University; Ph.D. 1980, Case Western Reserve University
- Sheldon Lee Morris, Research Scientist, Center for Biologics Evaluation and Research, U.S. Food and Drug Administration; Microbiology and Immunology  
B.S. 1974, Ph.D. 1982, University of Maryland
- Marshall Nirenberg, Chief, Laboratory of Biochemical Genetics, National Heart, Lung, and Blood Institute; Genetics (Biochemical Genetics)  
B.S. 1948, M.S. 1952, University of Florida; Ph.D. 1957, University of Michigan
- James Michael Ostell, Chief, Information Engineering Branch, National Center for Biotechnology Information, National Library of Medicine; Microbiology  
B.S. 1972, M.S. 1979, University of Massachusetts; Ph.D. 1987, Harvard University
- Jane Leslie Pearson, Research Psychologist, Division of Clinical Research, National Institute of Mental Health; Psychology  
B.A. 1980, Concordia College; M.A. 1982, Ph.D. 1987, Michigan State University
- Thomas L. Poulos, Professor of Molecular Biology and Biochemistry, University of California, Irvine; Genetics  
B.A. 1968, University of California, Santa Barbara; Ph.D. 1973, University of California, San Diego
- Richard Ruth, Emergency Therapist, Arlington Mental Health Center; Clinical Psychology  
B.A. 1974, New School for Social Research; M.A. 1977, Ph.D. 1986, Yeshiva University
- Herman Schneider, Microbiologist, Department of Bacterial Diseases, Walter Reed Army Institute of Research; Microbiology  
B.S. 1949, Roosevelt University; M.S. 1951, University of Illinois; M.S.P.H. 1956, University of North Carolina; Ph.D. 1962, Catholic University of America



Melvin E. Stratmeyer, Chief, Health Sciences Branch, Division of Life Sciences, U.S. Food and Drug Administration; Genetics

B.S. 1965, M.S. 1966, Ph.D. 1969, Purdue University

Heiner Westphal, Chief, Laboratory of Mammalian Genes and Development, National Institute of Child Health and Human Development; Genetics

M.D. 1962, University of Freiburg, Germany

Wayne R. Wolf, Lead Scientist, Nutrient Composition Laboratory, U.S. Department of Agriculture; Microbiology

B.S. 1965, Ph.D. 1969, Kent State University

Rosemary Zagarri, Visiting Assistant Professor of History, Catholic University of America; American Studies

B.A. 1977, Northwestern University; M.A. 1978, M.Phil. 1980, Ph.D. 1984, Yale University

## RESEARCH CENTERS AND INSTITUTES

The University recognizes that research contributes significantly to the academic stature, achievement, and capability of the faculty in fulfilling their responsibilities as teachers and public servants. To that end, the University seeks to ensure the close integration of research and teaching, including the employment of students in sponsored projects and the use of research facilities for instructional purposes. The following units are presently chartered for these purposes; the head of each unit is indicated in parentheses.

Biostatistics Center (*J. Lachin III*)  
Center for Applied Environmental Technology (*H. Helgert*)  
Center for Gastroenterology and Nutrition (*H. Fromm*)  
Center for Health Policy Research (*P. Budetti*)  
Center for History in the Media (*Becker, Seavey*)  
Center for International Health (*R. Rodriguez-Garcia*)  
Center for International Patent Studies (*H. Wegner*)  
Center for International Science and Technology Policy (*J. Logsdon*)  
Center for Native American Studies and Indian Policy Development  
(*A. Parker*)  
Center for Nuclear Studies (*D. Lehman*)  
Center for Social Policy Studies (*S. Levitan*)  
Center for the Study of Education and National Development (*J. Boswell*)  
Center for Washington Area Studies (*J. Henig*)  
Division of Research, Psychiatry, and Behavioral Sciences (*D. Reiss*)  
ERIC Clearinghouse on Higher Education (*J. Fife*)  
First Federal Congress Project (*C. Bickford*)  
Institute for Advanced Studies in Immunology and Aging (*A. Goldstein*)  
Institute for Applied Space Research (*H. Helgert*)  
Institute for Artificial Intelligence (*B. Silverman*)  
Institute for Brazilian Business and Public Management Issues (*F. Robles*)  
Institute for Disease Prevention (*O. Alabaster*)  
Institute for European, Russian, and Eurasian Studies (*J. Millar*)  
Institute for Information Science and Technology (*H. Helgert*)  
Institute for Magnetism Research (*E. Della Torre*)  
Institute for Management Science and Engineering (*W. Marlow*)  
Institute for Medical Imaging and Image Analysis (*M. Loew, S. Goodenough*)  
Institute for Reliability and Risk Analysis (*N. Singpurwalla*)  
Institute for the Study of Fatigue, Fracture, and Structural Reliability  
(*H. Liebowitz*)  
Institute for Urban Development Research (*D. McGrath*)  
Intergovernmental Health Policy Project (*R. Merritt*)  
International Institute for Human Evolutionary Research (*N. Boaz*)  
International Institute for Tourism Studies (*D. Hawkins*)  
International Rule of Law Center (*T. Buergenthal*)  
Joint Institute for the Advancement of Flight Sciences (*H. Liebowitz,*  
*J. Whitesides*)  
Labor Management Institute (*B. Burdetsky*)  
Lipid Research Clinic (*J. LaRosa*)  
National Health Policy Forum (*J. Jones*)  
National Ports and Waterways Institute (*J. Harrauld, A. Hochstein*)  
Ronald Reagan Institute for Emergency Medicine (*K. Ghezzi*)  
Gaston Sigur Center for East Asian Studies (*Y.C. Kim*)  
Space Policy Institute (*J. Logsdon*)  
Wilson Genetic Counseling Center (*J. Larsen*)



## **DIVISION OF CONTINUING EDUCATION**

**Acting Dean A.O. Smith**

**Assistant Deans B.J. Moreland, G.M. Logan**

### **Introduction**

The Division of Continuing Education administers the University's off-campus credit courses and degree programs. The Division offers noncredit certificate programs, courses, and workshops, and conferences and institutes. The staff of instruction for Division programs includes members of the full-time faculty of the University and academically qualified adjunct faculty from the professional community.

The Division works closely with education directors, public school officials, and personnel administrators in government, business, and industry to develop courses of study for continuing education students. The Division offers courses at the Crystal City Education Center in Arlington, Virginia, and other off-campus locations in the District of Columbia and suburban Maryland and Northern Virginia. The Division also offers, through its Hampton Roads Center, certificate and graduate degree programs in various disciplines at locations in the Hampton, Norfolk, and Virginia Beach area. A wide range of seminars and workshops is available to organizations and individuals from the professional community at several locations.

The academic standards of the University are maintained in off-campus credit courses. All off-campus programs offered and administered by this Division are approved through the procedure authorized by the Board of Trustees and the Charter granted by the Congress of the United States. Degrees are granted through the faculties of the degree-granting schools and colleges of the University. Credit earned through off-campus study conforms to academic standards throughout the University. All Division off-campus offerings in Maryland are approved by the Maryland State Board for Higher Education; those in Virginia are approved by the Commonwealth of Virginia Council of Higher Education.

Except as outlined below, all general University regulations apply to students in the Division of Continuing Education. In addition, Division students may be subject to special requirements of the school or college through which they are taking courses.

### **Admission as a Degree Candidate in Off-Campus Programs**

Students wishing to be admitted as candidates in an off-campus degree program may obtain application forms from the school concerned, the Division of Continuing Education, one of the University's off-campus representatives, or the education officer of their agency or installation.

### **Nondegree Students**

Off-campus credit courses may be taken by nondegree students who meet the prerequisites prescribed by the department concerned. Formal University admission is not required at the time of initial registration in off-campus courses. Those students who plan eventual degree candidacy should note that each school places a specific limit on the number of credit hours taken in nondegree status that can be applied toward a degree.

### **Degree Programs**

The following degree programs are offered through the Division of Continuing Education.

Columbian College and Graduate School of Arts and Sciences—For program information, see the field concerned under Courses of Instruction.

*Master of Arts* in the fields of administrative sciences (human resources management and organizational management), criminal justice (crime in commerce and security management), legislative affairs, telecommunication

*Master of Science* in the field of administrative sciences (management information systems)

School of Engineering and Applied Science—For program information, see the section on the School of Engineering and Applied Science.

*Master of Engineering Management*

*Master of Science* with major fields in communications, computer science, information management, operations research, telecommunications and computers

**Professional Degrees (Engineer and Applied Scientist)**

School of Education and Human Development—For program information, see the section on the School of Education and Human Development.

*Master of Arts in Education and Human Development* in the fields of early childhood special education, higher education administration, human resource development, supervision, transitional special education, education technology leadership

*Master of Education* in the field of secondary education

*Education Specialist* in the fields of administration, higher education, human resource development

### **Center for Career Education and Workshops (CCEW)**

CCEW provides a broad spectrum of services focusing on innovative, nontraditional, career-oriented education. Among CCEW programs are noncredit, graduate-level career certificate programs to prepare college graduates to become legal assistants, publication specialists, landscape designers, fund raising administrators, administrative managers, child-care administrators, facility managers, information systems specialists, public relations professionals, and Washington representatives. Other programs are designed to prepare certified employee benefit specialists and certified financial planners. Test review courses (for FSE, GMAT, GRE, LSAT, and MCAT) are offered as well. Workshops and short-term courses provide the opportunity for individuals to be informed of the innovation in their fields.

### **Office of University Students**

The Office of University Students (OUS) makes on-campus credit courses available to those who are not currently degree candidates at this University. Such students, often employed in government or industry, may be taking courses to enhance their career potential or as a matter of personal interest. They may be candidates for higher degrees at other institutions, sent here for special work as part of a graduate program. They may be undergraduates matriculated elsewhere, taking courses for transfer to their own institution.

All courses except those restricted to medical and law students are open to OUS students, provided there is room in the class and the student has sufficient preparation as determined by the academic departments.

Registration in a given course may be denied OUS students when space is needed for degree candidates. OUS students are not eligible to register for thesis or dissertation research nor for continuous enrollment or leave of absence. OUS requires a minimum registration of 3 credit hours per semester or session, except in special circumstances as approved by the dean.



### Entrance Requirements

An academic background appropriate for the program of studies contemplated is required. In addition, the applicant who has previously attended this or another college or university must be in good standing at that institution. An applicant who has been suspended from any educational institution for poor scholarship will not be considered for admission for one calendar year after the effective date of the suspension.

Applications for admission through OUS for a fall or spring semester should be obtained from and returned to the Office of Admissions. There is no application fee. For information on registration, please refer to the *Schedule of Classes*.

### Regulations

See Fees and Financial Regulations; University Regulations. Prospective and registered students are urged to acquaint themselves with the regulations concerning attendance and withdrawal stated under University Regulations. The following specifically apply to all students registered through OUS:

Last day to add a class for credit—end of second week of classes.

Last day to drop a class for credit or to withdraw from the University—end of the seventh week of classes.

Equivalent amounts of time apply to the summer sessions.

### Academic Work Load

For OUS students, the normal academic work load during the regular academic year is not more than 10 credit hours for a student employed more than 20 hours per week and not more than 18 credit hours for a full-time student. During the summer a student may take a maximum of two courses during any one session. Exceptions to these limits must be approved by the dean.

### Scholarship Requirements

A student who fails to maintain the scholarship requirements of OUS may be dismissed from the University. A statement of scholarship requirements is available in the office of the dean. All grades received in OUS remain on the record; scholarship requirements are based on the total record.

Grades—See University Regulations. There is no limitation on the number of courses that may be taken on a pass/no pass basis in OUS; however, there may be a limit on the number that can be transferred to fulfill degree requirements.

### Incomplete/Authorized Withdrawal

Conditions under which the grades of I (Incomplete) and W (Authorized Withdrawal) may be assigned are described under University Regulations.

Changing an Incomplete—The instructor normally sets a period (maximum of one year) within which the uncompleted work must be made up. An Incomplete that is not changed within one calendar year remains as a grade of I on the student's record.

### Change in Program of Studies

Change Within the Office of University Students—A student may not change status to that of auditor except with the approval of the dean (see Withdrawal, under University Regulations).

Transfer Within the University—Transfer to or from OUS may be made only with the approval of the deans concerned. Application for transfer to degree candidacy will be considered only after the completion of at least one semester in OUS or upon request from the college or school to which the student is seeking

admission. Students wishing to transfer to degree candidacy must meet the conditions of the college or school to which they are applying. It is the responsibility of the student to consult the college or school concerning conditions to be met and the amount of work transferable.

### **Other Noncredit Courses and Programs**

In addition to the noncredit offerings of the Division, the University offers a variety of noncredit professional development courses and programs through the School of Business and Public Management (Continuing Professional Education Office), the School of Engineering and Applied Science (Continuing Engineering Education Program), and the School of Education and Human Development (Center for Research and Services).



## **SUMMER SESSIONS**

Courses are offered during the summer by all degree-granting divisions of the University: Columbian College and Graduate School of Arts and Sciences, the School of Medicine and Health Sciences, the National Law Center, the School of Engineering and Applied Science, the School of Education and Human Development, the School of Business and Public Management, and the Elliott School of International Affairs. During the summer the University also offers special programs that are not available during the regular academic year. Courses are offered during both day and evening hours.

Students who are enrolled at the University for the spring semester may register for the following Summer Sessions without special application. Those who wish degree status may seek admission from the appropriate college or school within the University. Those who do not wish to work toward a degree at the University may apply through the "Quick Entry" process described in the Summer Sessions Announcement.

For a complete statement concerning summer term work, see the Summer Sessions Announcement.



## **STUDENT SERVICES**

### **Office of the Dean of Students**

The Office of the Dean of Students provides counseling and information for students, administers the nonacademic student disciplinary system and student grievance procedures, administers medical withdrawals, and assists in non-academic program development. Staff members are well informed on University policies and the various student services provided on campus, enabling them to provide referrals and answers to many questions concerning general student life. Personal letters of recommendation for students applying to graduate and professional schools can be obtained from this office.



### **Housing**

The University does not provide residence hall space for graduate students. However, the Office of Residential Life refers graduate students to apartments as they become available in University-owned buildings in the campus area. Additionally, the University's Off-Campus Housing Resource Center, can provide information and assistance for those seeking accommodations.

### **Food Service**

Contract food service is available from August to May, based on the academic calendar of registration, exams, and vacation periods. Rates for the various meal plans are available from the Office of Residential Life. Contract service is cafeteria style and provided in two residence halls and the Cloyd Heck Marvin Center. Meal coupons may also be used on a cash-equivalency basis in the cafeteria on the first floor of the Marvin Center and in George's on the fifth floor.

Students who observe the Jewish dietary laws can write to make arrangements with the Office of Residential Life regarding the B'nai B'rith Hillel Foundation Kosher Meal Plan.

### **Student Health Service**

The Student Health Service is an outpatient clinic staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be arranged by appointment or, during certain hours, secured on a walk-in basis. Many routine lab tests may be performed in the Health Service lab at cost; allergy shots, immunizations, and various lab tests are done at little or no charge. Psychiatric evaluation, crisis intervention, and short-term therapy are available by appointment.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. All fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Engineering Education Program are not eligible. The bills incurred from all services rendered outside of the Student Health Service (for example, x-ray work, laboratory work, and office visits to private physicians) are the responsibility of the student.

### **Health and Accident Insurance**

The University recommends that all students be covered by health and accident insurance. For information on group health insurance options offered through the University, students should contact the Student Health Service or Office of the Dean of Students.

### **University Counseling Center**

The University Counseling Center was established to help students resolve personal, social, career, and study problems that can interfere with their educational goals. Services include (1) short-term individual counseling, crisis intervention, and referral services for personal problems (e.g., academic pressures, relationship or family difficulties); (2) group counseling for personal problems; (3) educational/vocational counseling and testing; (4) workshops designed to address academic or personal development (e.g., test-taking strategies, study skills, communication skills, stress management); (5) consultation with faculty, staff, and student groups about their special needs in designing programs to improve the campus environment.

The Center administers the Miller Analogies Test, GW admissions tests, and special assessments for business and industry. Career counseling and referral services are available to GW faculty, staff, alumni, and individuals from the greater Washington community.

Students with disabilities are asked to call ahead so that arrangements can be made to adapt services or to meet at an accessible site.

### **The Speech and Hearing Center**

The Speech and Hearing Center provides diagnosis and treatment of a wide range of speech, language, and hearing disorders. These include developmental impairments of articulation and language, stuttering, voice disorders, and speech and language impairments resulting from neurological damage. Services are available for persons wishing to modify a regional dialect or foreign accent. Evaluation and aural rehabilitation are also provided for hearing-impaired individuals. The Speech and Hearing Center operates in conjunction with the Department of Speech and Hearing.

### **The Writing Center**

In conjunction with the Department of English, the Writing Center provides writing instruction to GW students at all levels of experience and expertise. Students are assisted in identifying writing problems and learning how best to express ideas. Trained tutors (undergraduate peer tutors, graduate students, and the director and other members of the faculty) work with students individually on areas of specific need or interest. Tutors provide assistance in such areas as organizing a mass of information efficiently and clearly, using correct grammar and punctuation, getting started on a writing project, developing a thesis, providing evidence in support of an argument, and presenting the findings of an experiment or the solution to a research problem.

### **Computer Information and Resource Center**

The Computer Information Resource Center (CIRC) provides computer facilities, technical assistance, and information on the use of computers and computer networks. CIRC supports IBM-PC, Apple Macintosh, and IBM mainframe computers. The CIRC computer laboratories are open seven days a week: 24 hours a day during the academic year and all day and evening at all other times. CIRC also maintains computer classrooms on campus; students generally have access to these rooms when classes are not in session.

In cooperation with the Gelman Library, GW Television, and Telecommunications Services, CIRC publishes a periodic newsletter on computing issues. CIRC gives seminars and offers technical advice to faculty and students regarding use of the IBM mainframe, IBM personal computers, Apple Macintosh personal computers, and the GW Data Network. Students and faculty may receive assistance from CIRC for microcomputer selection and acquisition. CIRC administers and can make recommendations on various discount-purchase programs for microcomputer equipment.

Any University student may have access to the computer facilities for individual research, class projects, and thesis or dissertation study.

### **Career Center**

The Career Center provides career planning and job-seeking assistance as well as a cooperative education program. Services include work-study; full-time and part-time job listings; career consulting; workshops (e.g., organizing job searches, resume and letter writing, effective interviewing); a resource library of career field and employer literature; on-campus interviews for students and alumni one year before and six months after graduation; a resume referral



service; resume critiques; a call-in job listings service; and a credentials service that supports employment and graduate/professional school applications.

#### **International Services Office**

The International Services Office provides services to GW's international students, scholars, faculty, and staff. The office provides advising on a variety of personal issues, including cultural adjustment, living conditions, academic concerns, and finances; provides immigration assistance and information on U.S. government requirements and regulations specific to the international community; conducts orientation programs to assist in living, studying, and working in the United States; and serves as a resource center for the University community on issues of cross-cultural understanding.

#### **Disabled Student Services**

The Disabled Student Services office works to assure that the special services necessary for disabled students to participate fully in their academic programs and the extracurricular life of the campus are provided for them through University or community resources.

#### **Office of Campus Life**

The Office of Campus Life furthers the educational mission of the University by offering programs, services, and facilities that foster the personal, professional, social, and cultural development of members of the University community. The Office of Campus Life is responsible for the Office of Residential Life, Campus Activities Office, Cloyd Heck Marvin Center, and Campus Life Publications and Information Services. Staff members assist individual students, campus organizations, and the University community with event planning, program coordination, and participation in special projects. The staff can also help in interpreting University policies and procedures that affect student life. Additional information about the services offered by the Office of Campus Life, and about the various student organizations and committees, can be obtained from the *Student Handbook*.

#### **Campus Activities Office**

The Campus Activities Office provides administrative support to the University Program Board and other groups planning major events. Other services include advisement of campus organizations, registration of student organizations, leadership training, planning and coordination of major campus events, and oversight of the Office of Community Services, the Off-Campus Housing Resource Center, and the Diversity Program Clearinghouse.

**Program Board**—The Program Board, composed chiefly of elected and appointed students, has the primary responsibility of allocating resources for student programming on campus. In addition, the Program Board provides funding for activities presented by various campus organizations and encourages student participation in program planning through involvement in committees on the arts, concerts, festivals, films, parties, political affairs, and public relations.

**Student Government**—The George Washington University Student Association is comprised of all full-time and part-time undergraduate and graduate students who are registered for academic credit on campus. A body of elected and appointed individuals is responsible for representing the interests of students at the University. The Student Association provides various services for students, such as academic evaluations, test and syllabus files, and the Student Advocate Service.

Student involvement in the governance of the University is also possible through participation in various administrative and Faculty Senate committees.

advisory councils of the schools and college, selected committees of the Board of Trustees, and specialized bodies, such as the Residence Hall Association, the Joint Food Services Board, and the Marvin Center Governing Board. This involvement has helped develop policies and programs beneficial to students and to the University community as a whole.

**Student Organizations**—Students are encouraged to become involved with existing student organizations or to initiate their own. There are approximately 200 registered organizations on campus, covering a broad spectrum of interests, including academic, professional, international, cultural, political, service, sports, hobbies, recreational, religious, and meditative groups as well as social fraternities and sororities.

#### **Campus Life Publications and Information Services**

This department produces several publications, including the *Student Handbook*, *Guide to Off-Campus Housing*, and the monthly arts and entertainment calendar, and advises student publications, such as the *Hatchet* and *Cherry Tree*. The department also supervises the GW Information Center and the Colonnade Gallery.

#### **The Cloyd Heck Marvin Center**

The Marvin Center is the GW campus community center. The Marvin Center offers programs, services, and facilities for students, faculty, staff, alumni, and University guests. The Center's wide range of facilities includes four dining locations, a theatre, lounges, recreational facilities, study rooms, conference and meeting rooms, the Off-Campus Housing Resource Center, Information Center, Colonnade Gallery, travel agency, computer store, bookstore, and newsstand with Ticketmaster. The Marvin Center provides facilities for programs conducted by the University Program Board, by academic departments that include the performing arts, and by other University organizations.

The Marvin Center Governing Board, which oversees the Center's policies, is a representative body composed of students, faculty, staff, and alumni. The Board works closely with the Center's staff in the review and development of policies, guidelines, and procedures that direct the operation of the Center.

#### **Religious Life**

The University recognizes the contribution that religion makes to the life of its students and encourages them to participate in the religious organizations of their own choice. Several religious bodies sponsor various groups and form a link between the University and the religious community. The advisors of the religious organizations are available for counseling and together constitute the Board of Chaplains to enhance religious life on campus. Religious services and special observances are also provided for the University community as announced.

#### **Major Program Events**

**Art Exhibits**—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Auditorium and in the Colonnade gallery of the Marvin Center. Student art exhibits are presented each semester.

**Concert Series**—The Department of Music presents a series of concerts featuring faculty, guest, and student artists throughout each year. Other concerts are held regularly in the Marvin Center, Lisner Auditorium, and the Smith Center.

**Dance**—The GW Dance Company presents major concerts, informal studio performances, experimental events, television appearances, and lecture-demonstrations. Students may audition to become company members and have the



opportunity to choreograph, perform, and gain experience in the technical aspects of dance productions.

*Glee Club, Jazz Band, and Orchestra*—The University Glee Club, Jazz Band, and Orchestra are available to students either as credit courses or as cocurricular activities. All of these organizations present major performances to the University community several times a year, including regular winter and spring concerts.

*International Programs*—The International Student Society presents an annual international dinner in cooperation with foreign embassies and international restaurants. Other programs include regular forums and speakers on international topics.

*Program Board*—The University Program Board, through its various committees and in cooperation with other campus groups, regularly sponsors films, lectures, concerts, social activities, and special events.

*Theatre*—The University Theatre produces four or five major plays and musicals during the year on the proscenium/thrust stage in the Dorothy Betts Marvin Theatre. Additional works, including original and experimental plays, are produced in a more intimate studio theatre. Students can participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

#### **Department of Athletics and Recreation**

The Charles E. Smith Center for Physical Education and Athletics offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track; a swimming pool; gymnastic and weight rooms; handball and squash courts; and a sauna and lockers. Based in the Smith Center, the Department of Athletics and Recreation offers a broad program of intramural and recreational activities designed to accommodate various levels of skill, experience, and interest.

The University is a member of the National Collegiate Athletic Association and the Atlantic Ten Conference. Its women's and men's intercollegiate varsity teams compete against major universities throughout the Midwest and Eastern Seaboard in such sports as basketball, baseball, soccer, tennis, golf, cross-country, crew, swimming and diving, water polo, badminton, volleyball, and gymnastics.

## FINANCIAL AID

George Washington University offers a program of financial assistance for undergraduate and graduate students. The program of financial assistance for graduate students includes assistantships, fellowships, traineeships, graduate scholarships, research appointments, part-time employment, and loans. Loans and resident assistantships not based on financial need are available. In general, consideration for financial aid is restricted to students in good academic standing who meet the minimum grade-point average for particular awards and are not financially encumbered by any other University office. Applications for institutional or federal aid cannot be processed if the relevant tax returns have not been filed in accordance with the IRS Code. Documents submitted as part of aid applications become the property of the University and cannot be returned. Federal regulations require that the University report suspected cases of fraud or misrepresentation to the appropriate federal, state, and local authorities.

Application and correspondence concerning assistantships, fellowships, traineeships, or graduate scholarships should be sent directly to the dean of the school concerned and addressed to George Washington University, Washington, D.C. 20052. Unless otherwise specified, application and supporting credentials should be submitted no later than February 1 preceding the academic year for which the award is made. Application for admission to graduate study is a prerequisite for consideration.

### Office of Fellowships and Graduate Student Support

The Office of Fellowships and Graduate Student Support provides information on awards that may be used in support of graduate study. These awards are generally sponsored by foundations, professional and learned societies, industries, and other organizations. Assistance is also offered to those wishing to apply for such prestigious fellowships as the Rhodes, Marshall, National Science Foundation, Fulbright, and Luce.

These services are provided to entering and enrolled graduate students, to enrolled undergraduates planning for graduate study, and to alumni. For students planning to enter a GW graduate program, a self-search graduate fellowship information section is maintained on the first floor of Gelman Library.

### Assistantships

**Research Assistantships**—May be available in departments with faculty who are participating in sponsored research.

**Research Scholar Assistantships**—School of Engineering and Applied Science, GW/NASA—Langley Joint Institute for the Advancement of Flight Sciences.

**Graduate Teaching Assistantships**—Available to graduate students in master's and doctoral programs in most departments of the University. A graduate teaching assistant receives financial compensation for a designated unit of service to the assistant's major department of instruction. All new graduate teaching assistants must attend an orientation and evaluation program.

**Resident Assistantships**—Available to graduate students in any field of study who are interested in working with the student personnel program in University residence halls. Specific duties vary with the position, but basically consist of counseling, advising student groups, and administration. Remuneration includes salary and a furnished room for the academic year. All positions are part time, and staff members are required to enroll as full-time students in degree programs. Further information may be obtained from the Office of Residential Life.



### Fellowships, Internships, Traineeships, Special Programs

**University Fellowships**—Available to graduate students in master's and doctoral programs in most departments of the University. Fellowships are based on scholarship and each fellow may receive a stipend and/or tuition allowance.

**Research Traineeships**—Available under numerous sponsored programs in a number of departments. Stipends vary; information is available from the departments.

**Other Fellowships, Internships, Traineeships, and Special Programs**—  
 Abdelfattah Abdalla Award  
 Achievement Rewards for College Scientists Foundation Fellowship  
 American Association of Collegiate Schools of Business Fellowship  
 American Civilization Fellowships  
 American Civilization Internships (Smithsonian Institution—  
 George Washington University Cooperative Program)  
 American Iron and Steel Institute Fellowship  
 American Red Cross Fellowships  
 Arthur Anderson & Co. Doctoral Fellowship  
 Aryamehr Research Fellowships  
 Benjamin Banneker Fellowship for Washington Area Studies  
 Bell Atlantic Graduate Fellowship  
 Business Administration Departmental Fellowships  
 Winfield Scott Blaney Fellowship in International Affairs  
 Oliver T. Carr, Sr., Memorial Fellowship in Urban and Regional Planning  
 Center for Washington Area Studies Fellowship  
 Thomas Alva Edison Fellowship  
 Elementary Teacher Education Internships  
 Ernst & Ernst Grant to Doctoral Candidates in Business or Economics  
 Ernst and Whinney Grant to Doctoral Candidates in Accountancy  
 Graduate Engineering Honors Fellowship Program  
 GW Fellowship for Ph.D. Studies in Government and Business  
 Health Services Administration Fellowships  
 Norris E. Hekimian Graduate Award  
 Industrial Liaison Program Corporate Graduate Student Fellowship  
 Richard D. Irwin Doctoral Fellowships  
 Marvin L. Kay Fellowship in Finance  
 Rita H. Keller Scholarship Fund  
 Isabella Osborn King Research Fellowships  
 Loula D. Lasker Fellowships in Housing, City Planning, or Urban Renewal  
 Loctite Fellowship  
 Morris Louis Fellowship in Painting  
 George McCandlish Fellowship in American Literature  
 Mellon Foundation Fellowships  
 Richard E. Merwin Memorial Award  
 National Association of Purchasing Management Fellowship  
 National Geographic Society Fellowships  
 National Historical Publications Commission—George Washington University  
 Cooperative Research Fellowships  
 National Science Foundation Graduate Fellowships  
 Planning and Related Professions Program  
 Presidential Merit Fellowships  
 Public Policy Studies Fellowship  
 Resources for the Future, Inc., Fellowship Prize  
 Rose Bibliography Internships  
 Thomas Bradford Sanders Fellowship

School of Engineering and Applied Science Graduate Fellowship  
Scottish Rite Foundation Fellowships  
ServiceMaster Fellowship  
U.S. Office of Education Fellowships  
U.S. Public Health Service Traineeships  
U.S. Public Health Service Traineeships in Comprehensive Health Planning  
Urban Studies Fellowships, Department of Housing and Urban Development  
Urban Transportation Center Fellowship  
Ronald Barbour Weintraub Research Fellowship in Biological Sciences

### Scholarships

American Association of Cost Engineers Scholarship  
Armed Forces Health Professions Scholarship Program  
Atlantic Research Corporation Scholarship  
Frederick Albert and Alma Hand Britten Scholarships  
Emma K. Carr Scholarships  
Oliver T. Carr, Jr., Scholarship in Urban and Regional Development  
James Edward Miller Chapman Educational Foundation Scholarship  
Daewoo Corporation Scholarships  
Vincent J. DeAngelis Scholarship Fund  
District of Columbia Institute of Certified Public Accountants Scholarship in Accounting  
Frederick H. Gibbs Scholarship in Health Services Administration  
Louis E. Giles Memorial Scholarships  
Leo and Lillian Goodwin Endowment Scholarship  
Government Career Development Scholarship  
Government Intern Scholarship  
Bryce Harlow Foundation Scholarship  
Hyundai Scholarship Fund  
Albert A. and Esther C. Jones Scholarship Fund  
Allen M. Jones Scholarship Fund  
Myron L. Loe Graduate Student Scholarship  
Mary and Daniel Loughran Graduate Scholarship  
Foster G. McGaw Scholarship in Health Services Administration  
Paul Pearson Scholarship Fund  
Phi Delta Gamma Scholarship Fund  
Public Administration Faculty-Alumni Scholarship  
Mildred Shott Scholarship Fund  
Voorhees Scholarships  
Wolcott Foundation Scholarships  
Helen and Sergius Yacobson Graduate Scholarship

### Loan Funds

The following loan funds are available to degree students. A separate application must be submitted for each loan program. Applications for the Perkins Loan Program should be filed no later than June 1 for the following academic year. The basic components of an application are the Free Application for Federal Student Aid, the Financial Aid Form of the College Scholarship Service, current federal tax returns, and an application for the Federal Stafford Loan Program. Complete information is contained in the graduate student financial aid pamphlet, which is available from the Office of Student Financial Assistance, George Washington University, Washington, D.C. 20052.

American Medical Association Nursing Home Administration Loan Fund  
George F. Henigan Loan Fund  
Inner-City Student Loan Fund



International Student Loan Fund  
Joanne Jacobs Student Loan Fund  
W. K. Kellogg Foundation Hospital Administration Loan Fund  
Jessie B. Martin Loan Fund  
Perkins Loan Program  
Barney Plotnick, Student Loan Fund  
Hiram Miller Stout Memorial Loan Fund  
University Student Emergency Loan Fund  
Edmund W. Dreyfuss Loan Fund  
Peter and Doris Firsht Loan Fund

**Federal Stafford Loans**—George Washington University is an eligible participant in the Stafford Loan Program. Graduate students may apply for a maximum of \$8,500 per year. Graduate students must apply for and be eligible for a full Stafford Loan before their eligibility for the Perkins Loan or College Work-Study will be determined. Students who intend to use the loan for payment of tuition at registration should submit an application, as well as all required supporting documents, no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

**Federal PLUS/SLS Loan Program**—George Washington University is also an eligible participant in the PLUS SLS program. The interest rate on the loans is variable, based on the interest rate on U.S. Treasury bills, to a maximum of 10% for the PLUS, 11% for the SLS. Repayment begins 60 days after the disbursement of the check. Parents of dependent students may apply for up to the cost of education less other aid each year for each student. Independent students may apply for up to \$10,000 per year on their own behalf. Students who intend to use the loan for payment of tuition at registration should submit an application no later than June 1 (fall semester registration), October 1 (spring semester registration), or March 1 (summer registration).

### **Student Employment**

The University participates in the Federal College Work-Study Program. Inquiries should be addressed to the Office of Student Financial Assistance. In addition, the Career Center maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students. After registration, students may apply at the Center for interviews and referrals to positions for which they are qualified.

### **International Students**

Limited awards for graduate teaching assistantships and University fellowships are the responsibility of the chairman of the department or dean of the school in which the degree is to be earned.

International students applying for graduate teaching assistantships must have minimum scores of 570 on the Test of English as a Foreign Language (55 in listening comprehension) and 250 on the Test of Spoken English. International students applying from outside the University may be appointed to graduate teaching assistantships but must attend an orientation and evaluation program held prior to registration. Those found to have difficulties with English will be required to enroll in specified courses in English as a Foreign Language and will be assigned nonteaching duties in place of classroom instruction. Such students will be reevaluated each semester; if they are not designated as qualified to give classroom instruction by the end of one academic year, the teaching assistantship will not be renewed.

Graduate students who are presently enrolled at GW and have been proposed as candidates for graduate teaching assistantships by their departments must pass the Test of English as a Foreign Language at the levels indicated above and

will be required to complete successfully the English for International Students oral interview and the orientation and evaluation program before they will be considered for graduate teaching assistantships.

For further information on requirements for international teaching assistants, contact the director of the University Teaching Center.

Long-term loan funds for undergraduate and graduate international students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available sufficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–May) was \$19,000 in 1992–1993 and will be substantially higher in 1993–1994; generally speaking, expenses for international students are about \$2,000 over the stated figure, which includes room and board, tuition, books, clothes, and incidental expenses, but not travel, holiday, or medical expenses.

#### **Veterans Benefits**

The Veterans Benefits office assists students entitled to educational benefits as active-duty personnel, veterans, or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that educational allowances will be paid.

When feasible, students entitled to benefits as active-duty personnel, veterans, or dependents of veterans should consult with the veterans counselor prior to submitting applications to the Veterans Administration. All such students should obtain the instruction sheet issued by the veterans counselor, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and that includes other information of general interest.



## PRIZES

**Accountancy Department Prize**—Two prizes for academic excellence, each awarded annually to a student in the Master of Accountancy and Master of Taxation programs.

**Elizabeth B. Adams Prize**—Awarded annually by the Department of Management Science to a graduating student for outstanding performance in the field of information systems management. The recipient is selected on the basis of scholarship, leadership within the Department, contributions to the University, and service to the community.

**Morris M. Aein Memorial Prize**—Awarded to a deserving student for excellence in drawing.

**American Institute of Certified Planners Outstanding Student Prize**—Awarded to a qualified candidate for the Master of Urban and Regional Planning who has demonstrated significant service to the community, University and Department, or professional planning community.

**William C. Barbee Prize**—Awarded to a deserving student for excellence in sculpture and sculptural ceramics.

**Sylvia L. Bunting Prize**—Awarded annually to a graduate student in the field of biology or zoology.

**Astere E. Claeysens Prize**—Established in 1981 by the Trustees of the Bess and Arthur Dick Family Foundation. It is awarded for the best original work in playwriting by a student enrolled in the University.

**Bertice Cornish Prize**—Awarded annually to an outstanding student completing a graduate program in special education.

**John Henry Cowles Prizes**—Two prizes, established by John H. Cowles, Grand Commander of the Supreme Council of Thirty-third Degree (Mother Council of the World) of the Ancient and Accepted Scottish Rite of Free-masonry, Southern Jurisdiction of the United States of America. Awarded upon graduation to the graduate or undergraduate student with the best overall scholastic achievement and leadership potential in the School of Business and Public Management and in the Elliott School of International Affairs.

**Elliott School of International Affairs Alumni Association Prize**—May be awarded annually to a graduate of the Elliott School of International Affairs (graduate or undergraduate degree recipient) who, in the opinion of the Dean and the Faculty, deserves recognition for academic achievement and contribution to the life of the George Washington University and its programs and goals.

**Harmon Choral Prize**—Awarded annually for significant musical accomplishment and outstanding contribution to the choral program.

**Ching-Yao Hsieh Prize**—Two prizes awarded annually, one to an undergraduate and one to a graduate student in the Department of Economics.

**Cecille R. Hunt Prize**—Offered annually to deserving art students and every two or three years to participants in the University's Art Alumni Exhibition.

**International Business Prize**—Two prizes awarded annually by the School of Business and Public Management to students specializing in international business, one awarded to a graduating senior and one awarded to a graduate student.

**Elmer Louis Kayser Prize**—Established by Paul and Elizabeth Rutheiser to be awarded annually by the Department of History for the best thesis in history submitted by a candidate for the degree of Master of Arts.

**David Lloyd Kreeger Prizes in Art**—Eight prizes given by Mr. Kreeger, six in the fine arts and two in art history (including museology). Fine arts prizes are awarded to a senior or graduate student in painting, sculpture, printmaking, ceramics, photography, and visual communication. One prize in art history is awarded to a senior and one to a graduate student. Candidates for the prizes must submit original papers or works of art. Winners are selected by distinguished representatives of the field of art in the Washington, D.C., area.

**Minna Mirin Kullback Memorial Prize**—Established in 1968 by Solomon Kullback in memory of his wife. Awarded annually by a committee of faculty members of the Department of Statistics to a full-time undergraduate or graduate student majoring in statistics, who will have completed 18 credit hours of statistics courses by the end of the spring semester.

**Milic Kybal Memorial Prize**—Established in 1985 by Elba G. Kybal in memory of her husband. Awarded to a master's or doctoral student in the School of Business and Public Management for the best presented paper.

**Martin Mahler Prize in Materials Testing**—Awarded to the upper-division or graduate student in engineering who submits the best reports on tests in the materials laboratory course, with preference given to prestressed concrete tests.

**Barry Manilow Endowed Prize in Music**—Established in 1983. Awarded annually to a student majoring in music. The award is made on the basis of academic performance and musical ability, as determined by a committee of faculty appointed by the chair of the Music Department.

**Vivian Nellis Memorial Prize**—Awarded to a student in the English Department who has shown special promise in the field of creative writing.

**Phi Delta Kappa Research Prize**—Awarded annually by the George Washington University Chapter to a graduate student, for an outstanding research project.

**Psi Chi Prizes**—Two prizes awarded annually by the George Washington University Chapter to the best undergraduate student in experimental psychology and to the M.A. degree candidate or second-year graduate student submitting the best thesis or research project in psychology.

**Public Administration Prize**—Awarded by the Department of Public Administration to the outstanding graduating student in public administration on the basis of scholarship, leadership, and service to the University.

**Riggs Trust Award**—Established by Francis J. Lyons, Vice-Chairman of the Board, Riggs National Bank, for the best graduate research paper in Business Administration 223, Investment Analysis and Portfolio Management.

**The Jack and Anne Ryan Award in Health Services Administration**—Awarded annually to that health services administration student who displays excellence of analysis and writing skills in the preparation of a paper on a topic in health services administration.

**Howard C. Sacks Prize**—Awarded to a student in political science who has demonstrated outstanding academic achievement in the study of Far Eastern affairs.

**Julian H. Singman Prizes**—Two prizes awarded annually, one in design and one in aquarelle painting.

**Society of Colonial Wars in the District of Columbia Prize**—A cash prize awarded to a candidate for a graduate degree who, in the judgment of the faculty of the Department of History, submits a thesis or dissertation demonstrating excellence in historical research in American Colonial history. The University reserves the right to withhold the award if no thesis or dissertation attaining the required degree of excellence is submitted.

**Alfred E. Steck Memorial Prize**—Awarded for proven excellence in the field of sculpture.

**Charles Clinton Swisher Historical Club Prize**—Established in 1936 by the Charles Clinton Swisher Historical Club and augmented in 1941 by the bequest of Professor Swisher. Awarded annually to the student who submits the best essay covering some phase of medieval history.

**James H. Taylor Graduate Mathematics Prize**—Established in memory of James H. Taylor, former Professor of Mathematics at the University. Awarded annually to a graduate student for outstanding performance in mathematics.

**Geza Teleki Prize**—Awarded for outstanding work in the geological sciences.

**Patricia M. Toel Memorial Prize**—Awarded annually to a graduate student in photography to recognize outstanding achievement.



*Benjamin D. Van Evera Memorial Prize*—Awarded annually to that Graduate Teaching Fellow in Chemistry selected as the most effective teacher during the current academic year.

*Thomas F. Walsh Prize*—Established in 1901 and awarded annually to the student who submits the best essay in Irish history.

*Elizabeth Reed Ward Award*—Established by the finance faculty of the School of Business and Public Management in honor and memory of Elizabeth Reed Ward, who was a teaching assistant in finance. The award is to be made to an outstanding teaching assistant in the Finance Department.

*Alexander Wilbourne Weddell Prize*—Established in 1923 by Virginia Chase Weddell in memory of her husband. Awarded annually to a degree candidate who writes the best essay on "the promotion of peace among the nations of the world." The prize essays shall become the property of the University and shall not be printed or published without the written consent of the University. The University reserves the right to withhold the award if no essay attaining the required degree of excellence is submitted.

*W. T. Woodson Prize*—Awarded annually to a graduate student demonstrating outstanding achievement in educational administration in the School of Education and Human Development.



## UNIVERSITY REGULATIONS

Students enrolled in the University are required to conform to the following regulations and to comply with the rules and regulations of the school or division in which they are registered.

Students who withdraw or are suspended, or who, for any other reason, are not registered at the University for one semester or more, may reenter and continue work only under the regulations and requirements in force at the time of return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration form, or any other University document, the student's registration may be canceled. If such falsification is discovered after the student has matriculated at the University, the student may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the faculty) for subsequent registration in the University.

### Registration

Information on registration procedures is stated in the *Schedule of Classes*, which is available in advance of each semester.

Registration in courses is open only to those persons formally admitted to the University by the appropriate admitting office, as well as those students in good standing who are continuing in an approved program of study.

No registration is accepted for less than a semester or one summer session.

Students may not register concurrently in this University and another institution without the prior permission of the dean of the school in which they are registered in this University. With the exception of students enrolled in joint degree programs, registration in more than one school of the University requires the written permission of the deans concerned, prior to registration. Registration is not complete until all financial obligations have been met.

### **Eligibility for Registration**

Registration for the following categories of campus students is held on the days of registration published in the *Schedule of Classes*. A student who is suspended or whose record is not clear for any reason is not eligible to register. Registration in a given course may be denied students in the Division of Continuing Education when space is needed for degree candidates.

**New Student**—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

**Readmitted Student**—A student previously registered in the University who was not registered on campus during the preceding semester must apply for and be granted readmission by the appropriate admitting office before being eligible for registration.

**Continuing Student**—A student registered on campus in the immediately preceding semester or the summer session preceding the fall semester is eligible to register assuming good standing and enrollment in a continuing program.

### **Completion of Registration**

Registration is not complete until financial obligations have been fulfilled. Attendance in class is not permitted until registration has been completed.

### **Program Adjustment (Add/Drop)**

The program adjustment period begins the first day of classes. Program adjustment requires the approval of an advisor.

### **Registration for Consortium Courses**

Degree students interested in taking courses at any of the other institutions in the Consortium of Universities of the Washington Metropolitan Area, Inc., should consult the program announcements of the other institutions. Consortium registration forms and instructions may be picked up in the Office of the Registrar. In order to participate in the Consortium program, students must obtain the approval of an advisor and should ascertain from the department of the institution where the course is taught whether they are eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar.

### **Student Status**

For the purpose of defining student status, graduate students taking 9 or more credit hours are considered to be full-time students. All other graduate students are considered to be part time.

### **Attendance**

Students may attend only those classes for which they are registered. Regular attendance is expected. Students may be dropped from any course for undue absence.

### **Scholarship Requirements**

Students who fail to maintain the scholarship requirements of the school or division in which they are registered may be dismissed from the University.

### **Grades**

Grades are mailed to students through the Office of the Registrar at the close of each semester. They are not given out by instructors or released over the telephone. The following grading system is used: A, Excellent; B, Good; C, Minimum Pass; CR, Credit; F, Fail; I, Incomplete; IP, Progress; W, Authorized Withdrawal;



Z, Unauthorized Withdrawal. Except for courses that specifically state that repetition for credit is permitted, a candidate for a degree at this University may not repeat a course in which a grade of C or above was received, unless required to do so by the department concerned. A written statement to this effect must be submitted to the student's dean by the appropriate department chair.

#### *Incomplete/Authorized Withdrawal*

When another grade has not been assigned, the symbol *I* (Incomplete), the symbol *W* (Authorized Withdrawal), or the symbol *Z* (Unauthorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given the instructor for the student's inability to complete the required work of the course. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond the student's control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course that is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, that instructor may initiate an appropriate grade change. The grade of *Z* is assigned when students are registered for a course that they have not attended and in which they have done no substantial graded work.

#### *Changing a Grade of Incomplete*

For information concerning changing a grade of Incomplete, consult the regulations of the school or division concerned.

#### *The Grade-Point Average*

Scholarship is computed in terms of the grade-point average, obtained by dividing the number of quality points by the number of credit hours for which the student has registered, both based on his or her record in this University. The grade-point average is computed as follows: *A*, four points; *B*, three points; *C*, two points; *F*, no points, for each credit hour for which the student has registered in a degree program. Courses marked *CR*, *I*, *IP*, *P*, *NP*, *W*, or *Z* are not considered in determining the average, except that courses marked *I* will be considered when a final grade is recorded. With the exception of Consortium courses, grades in courses taken at other institutions are not considered in computing the grade-point average.

#### *Final Examinations*

Final examinations for graduate-level courses are scheduled, if desired, by the individual department or instructor.

#### *Academic Dishonesty*

The University community, in order to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense

against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following officers: all department chairs, all academic deans, the Registrar, and the Vice President for Academic Affairs.

### **Student Conduct**

All students, upon enrolling and while attending The George Washington University, are subject to the provisions of the *Guide to Student Rights and Responsibilities*, which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained from the Office of the Dean of Students or from the offices of the academic deans. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

### **Withdrawal**

Withdrawal from a course or from the University requires the permission of the dean of the college, school, or division in which the student is registered. A grade of W will be recorded on the student's academic record. Permission to withdraw from the University will not be granted a student who does not have a clear financial record (see *Payment of Fees*).

Each school and division of the University sets deadline dates for each semester concerning withdrawal. Withdrawal between these dates and the end of the semester is permitted only in exceptional circumstances.

All charges for courses from which the student withdraws are subject to the refund policy listed under *Fees and Financial Regulations*. Unauthorized withdrawal will result in the recording of a grade of Z for the course or courses.

### **Changes in Program of Study**

**Changes Within a School or Division**—A student may not substitute one course for another, drop courses (see *Withdrawal*, above), or change status from credit to audit or from audit to credit without the approval of the dean of the school or division in which registered. Change from one section to another of the same course may be made with the approval of the dean and the department concerned. Change from one major field to another within the same school may be made with the approval of the dean.

**Transfer Within the University**—Application for transfer to another school or division must be made to the appropriate admitting office on the form provided by the office concerned.

### **Credit**

Credit is given only after completion of registration in a course and satisfactory completion of the required work, or upon the assignment of advanced standing in accordance with the regulations of the school or division concerned.

**Auditing**—A person who has been admitted to the University may be registered, with the permission of the instructor, as an auditor in a class (no academic credit). An auditor is not required to take active part or to pass examinations. A student who takes a course as an auditor may not repeat it later for credit. Tuition is charged at the prevailing rate.



**Post-Admission Transfer Credit**

Students who plan to attend another institution and apply credit so earned toward graduation from this University must first secure the written approval of their dean. In no event will credit in excess of what might be earned in a similar period in this University be recognized.

**Transcripts of Record**

Official transcripts of student records are issued on written request of the student or former student who has paid all charges, including any student loan installments, due the University at the time of the request. Official transcripts (those bearing the seal of the University and the signature of the Registrar) are not issued to students. They are sent, upon appropriate request, directly to other schools, employers, embassies, etc. In certain instances, the Registrar may issue an official transcript to a student in a sealed envelope; such an arrangement must be made with the Registrar when requesting the transcript. A fee of \$3 is charged for each official transcript. Unofficial copies of transcripts are available to students, by request, at a nominal fee. Partial transcripts are not issued.

**Continuous Enrollment**

Once entered in a degree program, a student is expected to be continuously enrolled and actively engaged in fulfilling the requirements for the degree each semester of the academic year until such time as the degree is conferred. Should the student break continuous enrollment at the University and not request and be granted a leave of absence (see below) or be assigned by the dean to inactive status (see below), he or she must apply for readmission and, if granted, be subject to the requirements and regulations then in force.

**Leave of Absence**

Should a degree student find it necessary to interrupt active pursuit of the degree, he or she may petition the dean for a leave of absence for a specific period of time, generally limited to one calendar year. A degree student who discontinues active enrollment in degree studies without being granted a leave of absence, or a student granted a leave who does not return to active study at the close of the period of approved absence, must apply for readmission and be subject to the regulations and requirements then in force. The right to use of University facilities is suspended while the leave is in effect.

**Inactive Status**

Under the regulations established by each school, a student may be considered in continuous pursuit of the degree while not enrolled in courses at the University when engaged in the following: cooperative engineering work semester; study abroad program; attendance at another institution with prior approval to have work transferred back to the GW program; completion of outstanding work in courses in which a grade of Incomplete was received; or non-course instructional activities unique to the particular school or college.

Students must request to be enrolled in inactive status, in advance of the year or semester concerned, and be granted approval by their dean for the specific activity desired. This status is generally limited to one year; no fees are assessed students while in this status.

**Graduation Requirements**

Degrees are conferred in January, May, and September.

To be recommended by the faculty for graduation a student must have met the admission requirements of the school in which registered; completed satisfac-

torily the scholarship, curriculum, residence, and other requirements for the degree for which registered; filed an application for graduation prior to the published deadline date; and be free from all indebtedness to the University. Enrollment is required for the semester or summer session at the close of which the degree is to be conferred.

An application for graduation form must be filed by the published deadline for the last semester or summer session of the final year. In addition to the conferring of degrees at the annual commencement in May, degrees will be conferred on September 30 for summer graduates and on January 30 for fall graduates. Students who complete degree requirements at the end of the summer and fall are invited to participate in the annual commencement the following May.

**Scholarship and Residence**—Students must meet the scholarship and residence requirements for the degree for which they are registered.

**Curriculum**—Minimum curriculum requirements for each degree are stated under the school offering work in preparation for the degree. In cases where specific curricular information is not provided in this Bulletin, the program of study, as indicated by the program faculty, must be completed.

**Thesis or Dissertation**—A thesis or dissertation submitted in partial fulfillment of requirements for a degree must be presented in its final form to the dean of the school concerned no later than the date specified in the University Calendar. Accepted theses and dissertations, with accompanying drawings, become the property of the University and are deposited in the University's Gelman Library, where the duplicate copies are bound and made available for circulation. See the appropriate school in this Bulletin for regulations governing theses and dissertations.

### **The Library**

All students registered in the University have the privilege of using the University's Gelman Library. Its stacks are open, and all students are welcome to browse. A card denoting approved enrollment for the current semester must be presented when books are borrowed for outside use.

The loan period for stack books is 21 days. Any book that circulates is subject to recall by the library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. Transcripts of grades are withheld until a student's library record is clear, with all borrowed books returned and any fines paid.

All students using the University's Gelman Library are expected to be familiar with its detailed regulations, available at any of the library's service desks.

### **Right to Dismiss Students**

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable.

### **Right to Change Rules**

The University reserves the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

### **Right to Make Changes in Programs**

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.



**University Policy on the Release of Student Information**

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as inaccurate, misleading, or otherwise inappropriate;
3. receive students' written consent before releasing information from their education records to persons outside the University, except as provided by the Act and except for directory information as indicated below (information may be furnished to a student's parents without such written consent only upon certification of the student's financial dependency); and
4. comply with a judicial order or lawfully issued subpoena to release a student's record, notifying the student of this action.

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin; dates of attendance; school, college, or division of enrollment; field of study; credit hours earned; degrees earned; honors received; participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height, weight, and age of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

**Property Responsibility**

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the University Police Office.

**University Policy on Drugs**

The University cannot condone violations of law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

## FEES AND FINANCIAL REGULATIONS

Fees paid by students cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution makes up the difference.

The following fees financial regulations were adopted for on-campus programs for the academic year 1993-94. Information on tuition and fees for off-campus programs is published in the Off-Campus Graduate Programs Schedule of Classes. Information on tuition and fees for the summer is published in the Summer Sessions Announcement.

### Tuition Fees

For on-campus graduate study in Columbian College and Graduate School of Arts and Sciences, the School of Business and Public Management, the School of Education and Human Development, the School of Engineering and Applied Science, the Elliott School of International Affairs, and the Division of Continuing Education: Graduate students and nondegree students taking credit courses at all levels are charged \$550 per credit hour on the main campus and \$470 per credit hour at the Virginia campus.

Three Virginia campus programs are charged at a single fee for the full program: the Executive Master of Science in Administrative Sciences offered by Columbian College and Graduate School of Arts and Sciences, \$29,960; the Executive Master of Business Administration offered by the School of Business and Public Management, \$42,650; and Executive Leadership in Human Resource Development, leading to the Doctor of Education, offered by the School of Education and Human Development, \$37,500.

**University Fee** (charged all students registered on campus)—\$29.50 per credit hour, to a maximum of \$295 per semester.

**Continuing Research**—All master's and doctoral students who have completed their required number of hours of Thesis Research or Dissertation Research must register each fall and spring semester for 1 credit hour of Continuing Research, Univ 299 or 399, until completion of the thesis or dissertation.

**Additional Course Fees**—In certain courses additional fees, such as laboratory and material fees, are charged by semester as indicated in the course descriptions. If breakage of apparatus is in excess of the normal amount provided for in the laboratory fee, the student will be required to pay such additional charges as are determined by the department concerned.

### Special Fees and Deposits (Nonrefundable)

Application fee (all degree candidates) . . . . .	\$45
Late registration during the first week of the semester . . . . .	75
Late registration after the first week of the semester . . . . .	125
Cap and gown fee (charged all students who choose to participate in commencement exercises) . . . . .	50
Late-payment fee (see Payment of Fees, below) . . . . .	50
Returned check fee, charged a student whose check is improperly drafted, incomplete, or returned by the bank for any reason . . . . .	25
Binding master's thesis . . . . .	30
Microfilm service, binding dissertation, and printing announcement of final examination (doctoral candidates) . . . . .	130
Engineers' Council fee (charged all SEAS students), per semester . . . . .	8
English test for international students (when required) . . . . .	15



Statement issued by the Department of Romance Languages and Literatures certifying the degree of oral and/or written fluency and command of the French, Italian, Portuguese, or Spanish languages . . .	50
Transcript fee . . . . .	3
Replacement of lost or stolen picture identification card . . . . .	25
Replacement of diploma . . . . .	50

Payment of tuition for thesis or dissertation research entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis or dissertation is to be written.

Registration for on-campus courses in the University entitles each student to the following University privileges: (1) the use of the University library; (2) the services of the Career Center; (3) gymnasium privileges; (4) admission to all athletic contests, unless otherwise specified. These privileges terminate when the student withdraws or is dismissed from the University.

### Postdoctoral Study

Those who have graduated from George Washington University with a Ph.D., Ed.D., D.Sc., D.B.A., or D.P.A. may continue any studies in the University without payment of tuition (contingent upon the availability of space) and may enjoy all University library privileges. Such graduates are required to pay a nominal fee based on the prevailing charge for one credit hour, as well as the University fee, in order to establish their active membership in the University. The use of laboratory space and equipment is contingent upon availability, and the cost of all laboratory or special library material is paid by the graduate. Special arrangements for such privileges must be made with the dean two months in advance of the semester in which the graduate wishes to register. Postdoctoral work taken under this privilege may not be taken for credit.

### Payment of Fees

When the student registers for courses to be taken in the forthcoming semester, a Schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 credit hours or more may use a deferred payment plan at the time of each registration, which permits payment of one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half by Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the first day of the semester to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to use deferred payment unless the total tuition and fee charges exceed the value of the tuition awards by \$3,000 or more. Under such circumstances the student may be permitted to pay one-half of the amount due at the time of registration and to defer the balance.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially

encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment in future semesters, and the Student Accounts Office will notify the registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within 15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

**GW Monthly Payment Plan**—The University's Monthly Payment Plan is available to all students. Upon receipt of the appropriate application, the University will establish an account and mail payment coupons and envelopes for use to ensure proper credit of payments. The plan covers an academic year (excluding summer sessions) and requires ten monthly payments, May through February. Payments must be received by the 10th of each month. If a decision is made after May to use this plan, all missed payments must be made to bring the account current to the time participation is initiated. There is no charge and no interest for using the plan if all payments are made as scheduled.

**Off-Campus Courses**—Fees for each semester are due and payable in full at the time of each registration; however, a student registering for a credit course lasting 13 weeks or longer may use deferred payment at each registration to make payments in two equal installments—one-half at the time of registration and one-half by the eighth week of the semester. Payments are due at the stipulated times. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the beginning of each semester to the date payment is made. Students receiving partial government tuition assistance, employee benefits, and partial scholarships must pay their portion of the tuition in full at the time of registration. Except for specified special sessions, tuition and fees for credit courses lasting less than 13 weeks and for all noncredit courses are payable in full at registration.

### Withdrawals and Refunds

Applications for withdrawal from the University or from a course after the registration period must be made in writing to the dean of the college, school, or division and to the registrar. Notification to an instructor is not an acceptable notice (see Withdrawal under University Regulations). Financial aid recipients must notify the Office of Student Financial Assistance in writing.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters:

1. **Complete withdrawal from all courses (on-campus students):**

Withdrawal dated on or before the end of the first week of the semester . . . .	80%
Withdrawal dated on or before the end of the second week of the semester . .	60%
Withdrawal dated on or before the end of the third week of the semester . . .	40%
Withdrawal dated on or before the end of the fourth week of the semester . .	25%
Withdrawal dated after the fourth week of the semester . . . . .	None
2. **Partial withdrawal:** If the change in program results in a lower tuition charge, the refund schedule above applies to the difference.



3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.
4. Summer Sessions: In cases of authorized withdrawals from courses, refunds of 75% of tuition and fees will be made for courses dropped within the first seven calendar days following the scheduled registration day. No refund will be made for courses dropped thereafter.
5. *Refund schedule for off-campus registration:*

After the first class meeting but before the third class meeting . . . . .	80%
After the third class meeting but before the fifth class meeting . . . . .	50%
After the fifth class meeting . . . . .	None

No refund will be made for sessions of less than 21 days.

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid; those students should check with the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education. Federal regulations require that financial aid recipients use such refunds to repay financial aid received for that semester's attendance. This policy applies to institutional aid as well.

In no case will tuition be reduced or refunded because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.

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## **DEGREES OFFERED BY THE GEORGE WASHINGTON UNIVERSITY**

*Columbian College and Graduate School of Arts and Sciences:* Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

*School of Medicine and Health Sciences:* Associate in Science (A.S.), Bachelor of Science (B.S.), Master of Public Health (M.P.H.), Master of Science in Health Sciences (M.S.H.S.), and Doctor of Medicine (M.D.)

*National Law Center:* Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

*School of Engineering and Applied Science:* Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S. [C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

*School of Education and Human Development:* Bachelor of Human Services (B.Hm.Sr.), Bachelor of Science in Exercise and Sport Science (B.S. in Ex.Sp.), Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

*School of Business and Public Management:* Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.).

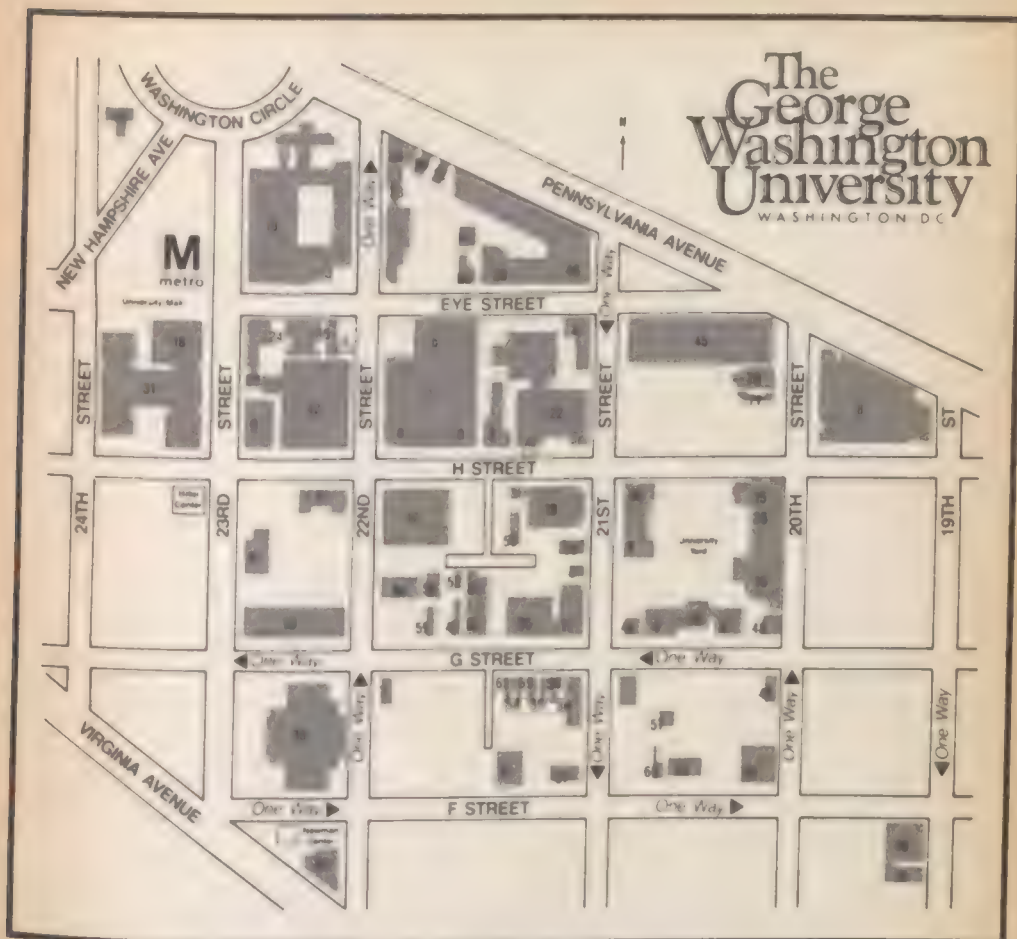
*Elliott School of International Affairs:* Bachelor of Arts (B.A.) and Master of Arts (M.A.)





# The George Washington University

WASHINGTON DC



## University Buildings\*

- |                                      |   |                                   |
|--------------------------------------|---|-----------------------------------|
| 1 Academic Center, 801 32nd St       | 23 Medical Faculty Associates and GW Health Plan  | 44 Woodhall House, 2013 G St      |
| a Phillips Hall                      | 24 Miller Hall, 2222 Eye St                       | 45 2000 Pennsylvania Avenue       |
| b Reno Hall                          | 25 Mitchell Hall, 194 22nd St                     | 46 2100 Pennsylvania Avenue       |
| c Smith Hall of Art                  | 26 Monroe Hall, 2174 G St                         | 47 Bldg O, 2100 G St              |
| 2 Adams Hall, 1714 Eye St            | 27 Morrison Hall, 2100 Eye St                     | 48 Bldg E, 2100 G St              |
| 3 Alumni House, 1714 22nd St         | 28 Daugherty Hall, 2100 Eye St                    | 49 Bldg H, 2100 G St              |
| 4 Bell Hall, 1714 G St               | 29 Roca Hall, 2100 Eye St                         | 50 Bldg J, 2100 G St (rear)       |
| 5 Carcasson Hall, 1714 H St          | 30 Riverside Towers Hall, 2100 Virginia Ave       | 51 Bldg K, 2100 G St              |
| 6 Crawford Hall, 1714 H St           | 31 Boxer Hall, 2100 Eye St                        | 52 Bldg L, 2100 G St (rear)       |
| 7 Davis-Hodgkins House, 2048 G St    | 32 Samson Hall, 2100 H St, 126 21st St            | 53 Bldg M, 2100 G St              |
| 8 Edson Bldg., 1900 Pennsylvania Ave | 33 Smith Center, 2100 22nd St                     | 54 Bldg Q, 2100 G St              |
| 9 Everglades Hall, 2100 H St         | 34 Staughton Hall, 2100 22nd St                   | 55 Bldg P, 2100 G St              |
| 10 Fungler Hall, 2100 H St           | 35 Stockton Hall, 2100 Eye St                     | 56 Bldg V, 2100 G St (rear)       |
| 11 Government Hall of, 110 21st St   | 36 Strong Hall, 2100 Eye St                       | 57 Bldg W, 2100 G St (rear)       |
| 12 Guthridge Hall, 2100 H St         | 37 Stuart Hall, 2100 Eye St                       | 58 Bldg X, 2100 G St              |
| 13 Hospital, University, 9th 23rd St | 38 Student Health Services, 2100 Pennsylvania Ave | 59 Bldg Y, 2100 G St              |
| 14 Kay Hall, 600 20th St             | 39 Support Building, 2100 F St                    | 60 Bldg AA, 2100 G St             |
| 15 Lerner Hall, 2000 H St            | 40 Thurston Hall, 2100 F St                       | 61 Bldg BB, 2100 G St             |
|                                      | 41 Benjamin Hall of Engineering, 2100 F St        | 62 Bldg EE, 2100 G St (rear)      |
|                                      | 42 University Garage, 2100 H St                   | 63 Bldg GG, 2100 G St             |
|                                      | 43 Warwick Bldg., 2300 H St                       | 64 Bldg HH, 2100 G St (rear)      |
|                                      |   | 65 Bldg II, 2100 Eye St           |
|                                      |   | 66 Bldg JJ, 2100 Eye St           |
|                                      |   | 67 Bldg TT, 2100 Eye St           |
|                                      |   | 68 Bldg VV, 2100 Pennsylvania Ave |
|                                      |   | 69 Bldg WW, 2100 Eye St           |
|                                      |   | 70 Bldg XX, 2100 Eye St           |
|                                      |   | 71 Bldg YY, 2100 Eye St           |
|                                      |   | 72 Bldg AA, 2100 Pennsylvania Ave |

## Parking

Ambulatory Care Center (see #73)  
Marvin Center (see #22)  
University Garage (see #42)  
Visitor parking entrance

\*All addresses are in Northwest Washington

For assistance or information about university services and resources, call the GW Information Center: 202-994-8250

Disabled individuals who need special information should call (202) 994-8250 100 voice.



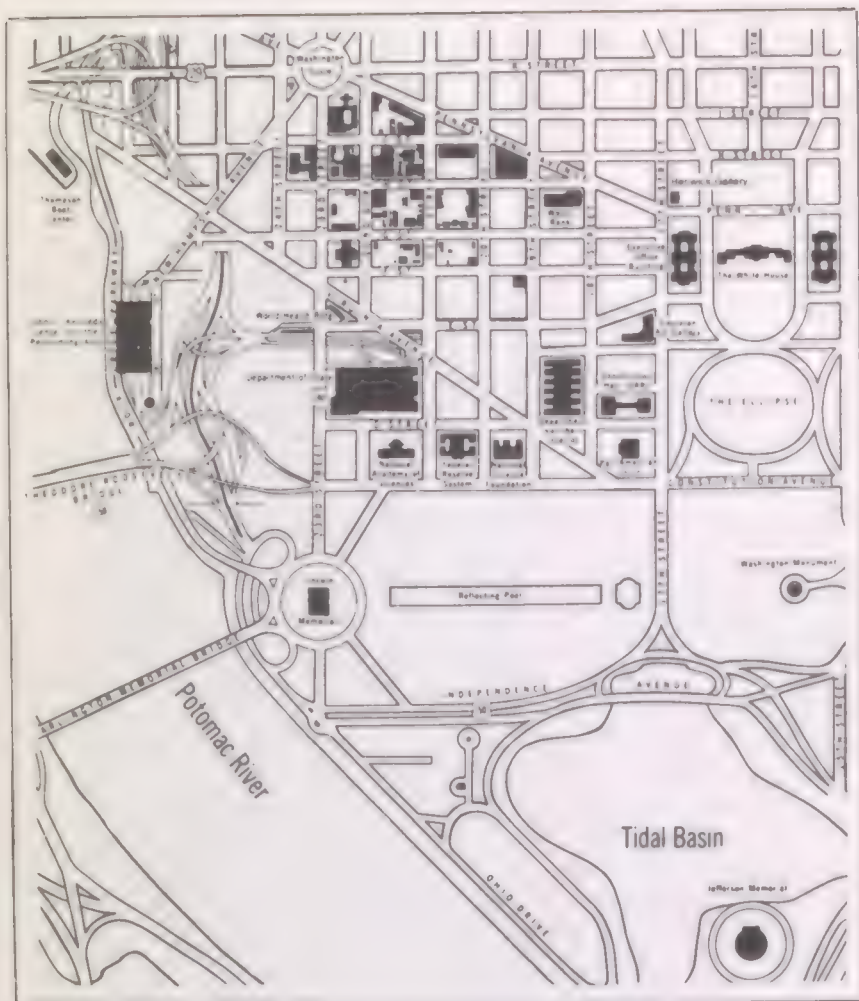
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# THE GEORGE WASHINGTON UNIVERSITY BULLETIN



NATIONAL LAW CENTER  
1993-1994





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## NATIONAL LAW CENTER 1993-1994



Please address correspondence to the office concerned at The George Washington University, Washington, D.C. 20052; telephone (202)994-1000. For information concerning Undergraduate Programs, Graduate Programs, the School of Medicine and Health Sciences, or the Summer Sessions, please request the appropriate Bulletin.



The University reserves the right to change courses, programs, fees, and the academic calendar, or to make other changes deemed necessary or desirable, giving advance notice of change when possible.

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## The Academic Calendar 1993-1994

### 1993 Fall Semester

<i>August 17-20</i>	Fall orientation and registration for new students
<i>August 23</i>	Classes begin
<i>September 3</i>	Last day of Drop/Add
<i>September 6</i>	Labor Day (holiday)
<i>September 10</i>	Deadline for Credit/No Credit option
<i>October 1</i>	Application for January 30 graduation due
<i>October 8</i>	S.J.D. dissertations of candidates for January 30 graduation due
<i>November 25-26</i>	Thanksgiving holiday
<i>November 30</i>	Constructive Thursday (makeup for Thanksgiving holiday)
<i>December 1</i>	Constructive Friday (makeup for Thanksgiving holiday) Last day of fall semester classes
<i>December 2-3</i>	LL.M. theses of candidates for January 30 graduation due Reading period
<i>December 6-17</i>	Examination period

### 1994 Spring Semester

<i>January 10</i>	Classes begin
<i>January 17</i>	Martin Luther King, Jr., Day (holiday)
<i>January 21</i>	Last day of Drop/Add
<i>January 25</i>	S.J.D. dissertations of candidates for May graduation due
<i>January 28</i>	Deadline for Credit/No Credit option
<i>February 1</i>	Application for May graduation due
<i>February 21</i>	George Washington's birthday observed (holiday)
<i>March 11</i>	Spring recess begins after last class
<i>March 21</i>	Classes resume
<i>April 26</i>	Constructive Monday (makeup for Martin Luther King, Jr., Day) Last day of spring semester classes
<i>April 27-29</i>	LL.M. theses of candidates for May graduation due Reading period
<i>May 2-13</i>	Examination period
<i>May 29</i>	Commencement

## **The National Law Center**

### **History**

The Law Center, the oldest law school in the District of Columbia, was established in 1865 with a formal program of two years of study. This was largely through the efforts of the Reverend Whitefield Samson, President of Columbian College, whose action resulted in the purchase of a separate building for holding law classes. The building had belonged to Trinity Church, of which Francis Scott Key had been Senior Warden. It was occupied by the Law Center until 1884.

Sixty graduates, from 22 of the then 37 states, received degrees in 1867. The school continued to have a student body and a faculty that reflected the fact that it was at the seat of our nation's government. Supreme Court Justices David J. Brewer and John Marshall Harlan were among the prominent members of the bench and bar who were on the faculty.

In 1877, one year after the first such program was adopted in the United States, the Law Center instituted a course leading to the degree of Master of Laws. In 1898, the course of instruction for the degree of Bachelor of Laws was extended to three years. The Law Center took part in 1900 in the organization of the Association of American Law Schools.

In the past quarter-century the Law Center expanded its course and seminar offerings with consideration of the needs of first-degree and graduate students. The degree of Doctor of Juridical Science was instituted in 1940. In 1946, the Law Center began accepting foreign attorneys into specially designated programs. Today, lawyers from other countries are accepted into the Master of Laws program.

In 1954, the National University School of Law, which had held an important place in legal education in the District of Columbia since 1869, was absorbed by the George Washington University Law School.

Since 1954, special programs of advanced study have enriched the basic curriculum. At present these include Environmental Law, Intellectual Property Law, International and Comparative Law, and Government Procurement Law. The academic courses reflect the breadth in public law for which the Law Center is well known. Additionally, a clinical law program has been developed that is the equal of that at any law school in the nation.

### **Location in the Nation's Capital**

Of special significance is the location of the National Law Center in a central area of the nation's capital, the focal point of the law in action, both American and international. The work of the Center goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and federal courts of special jurisdiction, such as the United States Court of Appeals for the Federal Circuit, the United States Tax Court, and the Court of Military Appeals. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floors of the House of Representatives and the Senate. With respect to the federal administrative agencies, students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission in the field of transportation; the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Energy Regulatory Commission in the field of water, natural gas, and



electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the federal government, and in the libraries of the headquarters of national and international organizations. The notable library of the Carnegie Foundation for International Peace has been acquired by George Washington University for use by research students in international and comparative law, fields with respect to which Washington has come to be called "The Capital of the World."

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University National Law Center is the government of the United States. As a consequence, the study of law takes on added meaning, whether the goal be government service or practice, general or specialized, and whatever the community in which the student plans to practice.

### Objectives

The purpose of the National Law Center is to prepare men and women to meet the needs of society in many fields of law and to encourage scholarly research and writing in the law. As a national law school, the Center does not emphasize any particular geographic area in its instruction; therefore, it prepares students to practice law in any part of the country. The Center also offers a program of legal education for foreign students. The Law Center seeks to fulfill these objectives through a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors; an extensive clinical law program in which students learn legal skills by actual practice; two law journals that specialize in public law and international law; trial practice; participation in the Van Vleck Appellate Case Club and several other moot court competitions; a series of student professional co-curricular activities; studies on an advanced level for foreign as well as for American students; a continuing legal education program for members of the bar, providing them with opportunities for course work within the curriculum; and scholarly research and writing in the law.

### Student Body

The National Law Center has a total enrollment of about 1,600 students. Approximately 1,100 students are in the full-time day division for the J.D. degree and 300 are enrolled in the part-time evening division. More than 200 students, many from abroad, are enrolled in the post-J.D. degree programs.

## **The Juris Doctor Degree**

### **Entrance Requirements**

Admission to the Juris Doctor degree program requires a bachelor's degree from an accredited college or university and a strong academic record. The Admissions Committee takes into account both the grades and the distribution of courses. The Admissions Committee considers personal and scholastic achievements, recommendations (if submitted), and the results of the Law School Admission Test (LSAT). The Committee also seeks social, ethnic, cultural, and geographical diversity in the student body. In the selection process, there is no discrimination against any applicant because of sex, race, color, religion, handicap, or national origin.

Information concerning the Law School Admission Test may be obtained from the Admissions Office of the National Law Center or from Law Services, Box 2001, Newtown, Pennsylvania 18940. The test is administered at various centers in the United States. Testing dates are usually in September, December, February, and June. Completed application forms must be received by Law Services at least one month before the date of the test. It is not necessary to apply to the law school before taking the test.

### **Admission**

Beginning students are admitted only at the start of the fall semester. Because admission decisions are made on a rolling basis, applicants are urged to submit application forms and complete credentials well in advance of the March 1 deadline. This means that the Law School Admission Test should be taken no later than December. Application forms are available at and should be returned to the Office of Admissions of the National Law Center, George Washington University, Washington, D.C. 20052.

The applicant should register with the Law School Data Assembly Service (LSDAS) by completing and mailing the registration forms supplied by Law Services. No application to this school will be processed unless accompanied by a Law School Application Matching Form, which is found in each applicant's LSAT/LSDAS registration packet. A transcript from each college or university attended should then be sent directly to LSDAS, Box 2000-M, Newtown, Pennsylvania 18940. The LSDAS will analyze the transcript(s) and send a copy to this law school and others that ordered a report. However, the applicant will be asked, upon acceptance, to submit directly to the National Law Center a final transcript showing evidence of the receipt of a bachelor's degree.

### **Advanced Standing (Transfer Students)**

A limited number of places is available for students who wish to transfer to the National Law Center after completing one year of legal studies at a law school accredited by the American Bar Association. A maximum of 28 credit hours may be applied to the Law Center's degree requirements. The primary factor considered in an admission decision is the student's first-year performance. No applicant will be accepted for transfer who is ineligible to return in good standing to a previously attended law school. Transfer students may apply for admission to the National Law Center for either the fall or spring semester. The deadlines for submission of transfer applications are July 1 for the fall semester, December 1 for the spring semester.

### **Foreign Attorneys**

A limited number of foreign attorneys who wish to prepare for law practice in the United States may be admitted to the Juris Doctor program. A student in this program who completes 28 credit hours of course work at this law school with a



grade-point average of 2.0 or above may be granted an additional 28 hours of advanced standing for law studies outside the U.S. and thereby earn the J.D. degree in two years. A student whose average is below 2.0 after taking 28 hours of course work must complete the full J.D. program which requires 84 hours of course work.

Students will be admitted to this program only at the start of the fall semester. The deadline for application materials is March 1, but applicants are encouraged to submit applications well in advance of the deadline.

### **Visiting (Unclassified) Students**

A law student who is in good academic standing as a degree candidate at an ABA-approved law school may be admitted to the National Law Center as an unclassified student and earn credit for transfer to his or her law school. Students may apply for visiting student status during the fall, spring, or summer semester. Admission will be based on the availability of space. The deadlines for application materials are July 1 for the fall semester, December 1 for the spring semester, and one month prior to the beginning of the summer session.

### **Full- and Part-Time Programs of Study**

Once admitted to the Juris Doctor degree program, candidates are given the option, as space permits, of attending one of three divisions in their first year: full-time day, full-time day/evening, or part-time evening. Once enrolled, students may transfer between divisions only with the permission of the dean. See Academic Work Load, Residence, and Required Curriculum, below, for regulations governing the day, day/evening, and evening divisions.

### **Degree Requirements**

In order to earn the Juris Doctor degree, students must satisfactorily meet the following academic requirements: Completion of 84 credit hours; fulfillment of the residence requirement; completion of the required curriculum; and maintenance of the minimum grade-point average of 1.67.

### **Residence**

Candidates for the Juris Doctor degree must complete a residence period of three academic years. At least two academic years of residence are required of students admitted with advanced standing. Attendance as a full-time student (11 or more credit hours) for each of the fall and spring semesters constitutes residence for only one academic year, regardless of how many credits over 11 the student takes in any one semester; attendance as a part-time student (8–10 credits each semester) constitutes residence on a proportional basis. Consequently, a full-time student must attend six semesters to meet residence requirements; a part-time student must attend eight semesters plus at least one summer session. Students who attend the summer session receive fractional residence credit. These residency requirements apply to all J.D. students in the National Law Center.

### **Required Curriculum**

#### ***Full-Time Day Division***

Full-time students in the day division must take the following schedule in their first year: fall semester—*Contracts I, Torts, Criminal Law, Civil Procedure I, and Legal Research and Writing*; spring semester—*Contracts II, Property, Constitutional Law I, Civil Procedure II, and Introduction to Advocacy*.

During the second or third year of study, all full-time day division students must take *Professional Responsibility and Ethics* and the two-credit legal writing re-

quirement. Those students who will graduate in May 1994 or earlier are also required to take *Evidence*, *Criminal Procedure*, and *Constitutional Law II*.

### **Full-Time Day/Evening Division**

Full-time students in the day/evening division must take the following schedule in their first year: fall semester—*Contracts I*, *Torts*, *Civil Procedure I*, and *Legal Research and Writing*; spring semester—*Contracts II*, *Constitutional Law I*, *Criminal Law*, *Civil Procedure II*, *Professional Responsibility and Ethics*, and *Introduction to Advocacy*.

Students who attended the full-time day/evening division in their first year must take *Property* in the fall semester of the second year of study and the two-credit legal writing requirement during the second or third year.

### **Part-Time Evening Division**

Part-time evening division students must take the following schedule in their first and second years: first year, fall semester—*Contracts I*, *Torts*, and *Legal Research and Writing*; first year, spring semester—*Contracts II*, *Criminal Law*, *Constitutional Law I*, and *Introduction to Advocacy*; second year, fall semester—*Property*, *Civil Procedure I*, and 3 hours of electives; second year, spring semester—*Civil Procedure II* and 7 hours of electives.

During their second, third, or fourth year of study, all part-time evening division students are required to take *Professional Responsibility and Ethics* and the two-credit legal writing requirement. Those students who will graduate in May 1994 or earlier are also required to take *Evidence*, *Criminal Procedure*, and *Constitutional Law II*.

### **Legal Writing Requirement**

Completion of a two-credit course, which is graded on the basis of written work (not examination), is required for the Juris Doctor degree. This requirement may be satisfied by service on the *Law Review* or the *Journal of International Law and Economics*, by satisfactory completion of a seminar or other course that requires or permits a research paper, by participation in upper-class Moot Court, or by satisfactory completion of Law 314, *Independent Legal Writing*. (See Research Papers for guidelines.)

## **Academic Regulations**

### **Academic Work Load**

Juris Doctor candidates without substantial outside employment (no more than 20 hours a week) may take a program of studies of 15 credit hours per semester. After the first year of study, full-time students may take courses in the evening only if they take a majority of their hours in day courses. The dean is authorized to approve programs of study of more than 15 credit hours in exceptional cases; however, no program will be approved that would permit the student to complete requirements for the degree in less than 28 months after beginning the first year of law study. Students with more than 20 hours of outside employment, whether in the day or evening division, must take a limited program of studies not exceeding 10 credit hours; the minimum load is 8 credit hours, except in special cases when fewer hours may be approved by the dean for a limited time. A minimum schedule of 11 credit hours is required for students to be considered full-time.

Full-time Juris Doctor students may take a maximum of 7 credit hours and part-time students may take a maximum of 5 credit hours in any summer session. This includes hours taken at other law schools' summer programs (see Summer School Credit from Other Law Schools).



After the first year, students may, with the dean's permission, transfer from one division to another but should be advised that there may be residency consequences (see Residence).

### Student Employment

A student taking more than 10 hours of course work must limit outside employment to not more than 20 hours. It is urged that all full-time students refrain from engaging in outside employment during their first year. Although work in some special areas may contribute to the learning and experience of the student, as a general rule it will compete with the time needed for adequate study and preparation, which are at the heart of a good legal education.

### Academic Evaluation

#### Grades

Effective fall 1993, letter grades are given with numerical equivalents as follows.

A+ = 4.33	B+ = 3.33	C+ = 2.33	D = 1.0
A = 4.0	B = 3.0	C = 2.0	F = 0
A- = 3.67	B- = 2.67	C- = 1.67	

Some courses are graded on a Credit/No Credit basis (see Courses of Instruction); a student must earn a grade of C- or above to receive credit in such a course.

In Law 220, 221, 311, 460, 461, 493, and 494, the following grading scale is used: *H* (Honors), *P* (Pass), *LP* (Low Pass), and *NC* (No Credit). For Honors, a student must do work of excellent quality, and no more than 25 percent of the class may earn this grade. No Credit is given for grades below C-.

A student who has been excused from taking a regularly scheduled examination is given the grade of *I*, Incomplete. See Examinations for grade upon failure to take an examination.

Credit toward the degree is given for all grades between *D* and *A+*, with the exception of Law 220, 221, 311, 460, 461, 493, and 494 (see above). A J.D. student who receives a grade below *D* has the right to retake the course once, from the same or a different instructor, but only within the next academic year. However, the failing grade remains on the record.

The cumulative average of a student includes all grades in all courses taken at The National Law Center while a candidate for the degree.

No grade may be changed by an instructor after it has been posted in the law school or disclosed to the student unless there has been an arithmetic or administrative error certified in writing as such by the instructor. A student has the right of faculty peer review of complaints of "capricious or prejudiced academic evaluation" under the regulations outlined in *The George Washington University Guide to Students' Rights and Responsibilities*.

#### Honors

The degree of Juris Doctor "With Highest Honors" is awarded to those students, not exceeding three percent of the graduating class, who have obtained the highest cumulative averages of at least 3.67.

The degree of Juris Doctor "With High Honors" is awarded to those students with the highest cumulative averages of 3.33 or better. The number of students receiving degrees "With High Honors," when added to the total number of students receiving degrees "With Highest Honors," may not exceed 10 percent of the graduating class.

The degree of Juris Doctor "With Honors" is awarded to those students with the highest cumulative averages of 3.0 or better. The number of students receiving degrees "With Honors," when added to the total number of students receiving

degrees "With High Honors" and "With Highest Honors," may not exceed 40 percent of the graduating class.

### ***Order of the Coif***

The Order of the Coif, a national legal honor society, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University chapter was established in 1926. Members are elected each year from the highest-ranking 10 percent of the graduating Juris Doctor candidates. Only students who have completed their full course of study at the National Law Center are eligible for membership.

### **Credit/No Credit Option and Limits**

J.D. candidates may take, in addition to the courses regularly given on a Credit/No Credit basis, 6 credit hours of elective course work on a Credit/No Credit basis. A student must earn a grade of C- or better to earn Credit. The Credit/No Credit option may be elected for only one course during a semester or summer session. The final date for an election of Credit/No Credit in a graded course will be the Friday of the third week of a semester or summer session. An unexcused failure to take an examination in a course or failure to submit a required research paper will result in the recording of a grade of F for a course taken on a Credit/No Credit basis.

After the first year, no student may take more than 17 credit hours of courses graded on the basis of Credit/No Credit or Honors/Pass/Low Pass/No Credit. Credits earned in *Legal Research and Writing* (220) and *Introduction to Advocacy* (221) do not count toward the 17-hour limit.

Students are advised to consider carefully the advisability of electing to take courses on a Credit/No Credit basis. In the opinion of the faculty, a student's election to take courses on a Credit/No Credit basis may be detrimental to the student's career in the legal profession because of the importance usually attached to grades by educational institutions and employers.

### **Examinations**

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. If a student fails to take an examination, a grade of F will be recorded unless the student has been excused from the examination or has obtained the dean's permission to drop the course. No excuse for absence will be granted except by the dean and then only for illness or other emergency. Application for excuse must be made in writing as soon as possible but not later than one month after the date of the examination. A student who has received an excused absence for a graded course has two options: The student may comply (prior to the completion of the semester following the excused absence) with the instructor's procedure of evaluation on a Credit/No Credit basis (minimum grade of C- required for J.D. candidates), or the student may have the grade of I (Incomplete) entered on the record and take the next regularly scheduled examination for a letter grade. The examination may not be taken after exclusion for low scholarship. Permission to take an examination before the regularly scheduled date and time will not be granted.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to the next regular examination in the subject may petition the Academic Scholarship Committee, which may authorize such action as the circumstances require.

### **Research Papers**

The preparation of a research paper is required in lieu of an examination in seminars and other courses, as indicated in the course descriptions. To receive a letter grade on a research paper, the paper must be submitted by the last day of



classes in the semester or, with the permission of the instructor, by the last day of the examination period (the last day of any examination given in any course). For sufficient reason, the instructor may extend the deadline up to the last day of the examination period of the following semester, if the extension is to a date beyond the normal graduation date for the student, the express permission of the dean is required. When a deadline for a paper is extended, the following conditions apply: (1) no student will receive any credit for the course for any purpose until a paper acceptable to the instructor has been submitted; (2) the only grade the student may receive for the course is *CR* (Credit) or *NC* (No Credit). To receive credit, a minimum grade of *C-* is required for J.D. candidates. Failure to submit any paper within the deadline will result in a grade of *F*. Students who are candidates for the J.D. degree may register for one course requiring a research paper in each semester; with the approval of the dean, they may register for more than one such course each semester.

The following guidelines have been approved by the faculty and are intended to apply to Law 314, *Independent Legal Writing*, and to research paper courses that satisfy the legal writing requirement. The faculty recommends that the paper's topic and length should receive specific approval by the faculty member. Furthermore, an outline should be submitted, to be followed by a draft. (The purpose of a draft, submitted during the course of the semester, is to allow the student the opportunity to improve the paper. A faculty member has the discretion to require a revised draft or to permit one if so requested by the student. A revised draft is necessary only if the professor requires it.) Approval of the topic, outline, and draft should be by a specific date. The paper should follow the Blue Book style.

### **Changes in Program of Study**

Juris Doctor degree candidates may make changes in their class schedules during the first two weeks of classes. After that time, students may not add courses except with the permission of the dean and may drop courses only with the approval of both the instructor and the dean. Under no circumstances may a student drop a course after the last day of classes in any semester.

### **Attendance**

Regular attendance at classes is required and is necessary for successful work. A student who is shown by the instructor to be deficient in class attendance or participation may be withdrawn from a course administratively.

### **Exclusion and Probation for Low Scholarship**

A student whose cumulative average at the end of any semester falls below 1.67 but is above 1.6 will be put on probation. If such a student fails to raise the cumulative average to 1.67 at the end of the next semester, the student will not be permitted to register for any succeeding semester unless he or she petitions for and receives the permission of the Academic Scholarship Committee; however, all students will be allowed to complete the first two semesters of law study before being subject to such a probation.

A student whose cumulative average at the end of any semester falls below 1.6 will be excluded from further study unless the student petitions for and receives the permission of the Academic Scholarship Committee; however, all students will be allowed to complete the first two semesters of law study before being subject to such an exclusion.

A student who fails or receives a grade of No Credit in more than one course over the entire period of law study will be excluded from further study and may not graduate unless the student petitions for and receives the permission of the Academic Scholarship Committee. This rule applies to all students including those in their first year of study.

Students who are registered at the time they receive notice that they will not be permitted to continue their legal studies may receive a full refund of the tuition paid for the semester.

For this purpose the term "semester" includes the summer session.

### ***Procedure for Reinstatement***

Any student excluded may petition the Academic Scholarship Committee for reinstatement. The Committee will readmit the student if he or she can demonstrate 1) that the low grades were due to circumstances beyond his or her control and 2) that he or she has the capacity to pursue the study of law with a definite likelihood of success. The Committee may place conditions on a student's readmission, for example, the Committee may require that the student take specific courses or it may place limits on outside employment.

### **Continuous Enrollment**

Degree candidates are expected to maintain continuous enrollment until all degree requirements are satisfied. By failing to register for one semester or more, the student is dropped from the University's rolls and must be readmitted (see Readmission below). A student who has been granted a leave of absence must maintain continuous enrollment by paying the University registration fee and having the appropriate status noted at the time of registration.

### **Leave of Absence**

After completion of the first year of study, a student may petition the dean for a leave of absence from the law school. A leave of absence will be granted only when the request is sufficiently compelling, and no leave of absence will be granted in excess of one academic year. A student who has been granted a leave of absence must comply with the University's registration procedures for maintaining continuous enrollment. Any student who does not maintain continuous enrollment while on a leave of absence will be required to petition the Academic Scholarship Committee for readmission.

### **Visiting at Another Law School**

A student whose personal circumstances necessitate leaving the Washington, D.C., area may be permitted to study at another ABA-accredited law school and apply the credits earned at that school toward his or her J.D. degree at the National Law Center. A student must petition the Academic Scholarship Committee and demonstrate that compelling personal circumstances warrant study at another institution. The Committee may grant one-semester visits, permission to visit for two semesters may be granted, but only in exceptional circumstances, and in no event will the Committee allow more than 28 credit hours of study taken at another school to be counted toward the degree here. The courses to be taken at another law school must be approved in advance by the dean, and a student must earn a grade of C or better (under the grading system of the other law school) to transfer the credit hours with a grade of Credit to the Law Center. Students who register at another law school must provide the dean with an official transcript of their work there promptly on its completion.

### **Readmission**

A student who was previously registered but did not attend during the most recent semester (summer session excluded), and who has not been granted a leave of absence, must apply to the Academic Scholarship Committee for readmission. A readmitted student is required to satisfy the curriculum requirements existing at the time of readmission.



### **Credit for Courses Taken in Other Departments**

With the approval of the dean, second- and third-year students may take a maximum of 6 credit hours of appropriate graduate-level courses in other departments of the University; a grade of at least *B* must be received to obtain credit for such courses; and the grade does not count in computing the cumulative average. Grades of Credit or No Credit resulting from courses taken in other departments will count toward the total of 17 hours allowed under the Credit/No Credit option.

### **Summer School Credit from Other Law Schools**

Juris Doctor students may earn no more than a total of 6 credit hours from summer programs at other law schools toward their degree. Students planning to attend summer sessions at other law schools and intending to use the credit toward their Juris Doctor program at the Law Center must first have the courses they wish to take approved by the dean. Students may not take courses in summer sessions at other law schools in this vicinity if the same courses are being given during the summer session at the National Law Center. A student must earn a grade of *C* or better (under the grading system of the other law school) to transfer the credit hours with a grade of Credit to the Law Center; and the grade does not count in computing the cumulative average. Grades of Credit or No Credit resulting from courses taken at other law schools during the summer will count toward the total of 17 hours allowed under the Credit/No Credit option. Credit will not be recognized in excess of that which can be obtained in a similar period at the National Law Center. Students who register at another law school must provide the dean with an official transcript of their work there promptly on its completion.

### **Joint Juris Doctor–Master's Degree Programs**

The National Law Center offers joint degree programs with three other schools of the University. With the School of Medicine and Health Sciences, the J.D./M.P.H. (public health) is offered. Degrees offered with the School of Business and Public Management include the J.D./M.B.A. (business administration), J.D./M.P.A. (public administration), and J.D./M.H.S.A. (health services management and policy). Degrees offered with the Elliott School of International Affairs include the J.D./M.A. in the fields of international affairs; international development studies; security policy studies; science, technology, and public policy; European studies; Russian and East European studies; East Asian studies; and Latin American studies.

Students must be admitted to both the National Law Center and, separately, to the school that will confer the master's degree. Each school must also independently approve a student's application to pursue a joint degree program. The Law Center will allow 12 credit hours of work completed in the master's program to count toward completion of the 84 credits required for the law degree, making it possible to complete both degrees within four years. A number of other rules govern the joint degree programs. Students interested in entering one of the programs should see the appropriate dean.

## **Graduate Programs**

The National Law Center offers advanced degree programs leading to the Master of Laws and Doctor of Juridical Science degrees for U.S. and foreign attorneys. The International Legal Studies LL.M. program is designed especially for graduates of foreign law schools who may pursue the degree in International and Comparative Law or in other fields. Both the LL.M. and S.J.D. programs offer an opportunity for attorneys to gain a more in-depth understanding of the law while engaging in scholarly research.

### **The Master of Laws Degree**

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The Master of Laws candidate may follow a program of general study and design an individual program or may concentrate in one of the specialized areas listed below. Graduates who complete their work in one of these areas may have the field of specialization noted on their diplomas.

- Environmental Law
- Government Procurement Law
- Intellectual Property Law
- International and Comparative Law

### **Entrance Requirements**

For applicants with an American law degree, a Juris Doctor or equivalent degree is required from a law school that is a member of the Association of American Law Schools or is approved by the American Bar Association. The applicant must have demonstrated a high degree of academic excellence in earning the first law degree.

Foreign attorneys must have completed a law degree with high academic standing from a recognized foreign university. Foreign attorneys may also need to meet the minimum language test requirement (see below).

Advanced standing is not granted for credit earned while a candidate for the first law degree or for credit earned at any time before the student was a degree candidate in the LL.M. program at the National Law Center.

### **Admission**

#### **U.S. Attorneys**

Application forms are available at and should be returned to the Graduate Admissions Office of the National Law Center, George Washington University, Washington, D.C. 20052.

Applications are due in the Graduate Admissions Office by June 1 for the fall semester, October 1 for the spring semester, and one month prior to the beginning of the summer session for which application is made.

#### **Foreign Attorneys**

Foreign attorneys are admitted to the International Legal Studies program beginning in the fall semester only. Application forms are available at and should be returned to the International Legal Studies Program, National Law Center, George Washington University, Washington, D.C. 20052.

Applications are due in the International Legal Studies Program Office by May 1.

#### ***Test of English as a Foreign Language (TOEFL)***

Students from countries where English is not an official language are required to take the Test of English as a Foreign Language and attain a score in the 600-point range to be considered for admission at the National Law Center. This is a manda-



tory requirement. Students are responsible for making arrangements for taking the test and should address inquiries to TOEFL, Educational Testing Service, Princeton, New Jersey 08541, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have the test score sent to three institutions. Registration for the Test of English as a Foreign Language does not constitute application for admission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and an application blank. On the application for the test, the student should specify that the scores be sent to the International Legal Studies Program Office of the National Law Center.

### Degree Requirements

In order to earn the Master of Laws degree, all students must fulfill the following requirements: completion of 24 credit hours of credit including the required curriculum in the specialized programs (see Curriculum, below); attendance for a residence period of not less than two semesters, which should be consecutive; achievement of a cumulative grade-point average of 2.67 (2.33 for foreign attorneys) at the time all requirements are met; completion and acceptance of a thesis (may be waived for foreign attorneys—see Thesis Waiver below); completion of all requirements at the National Law Center; and, for foreign attorneys only, completion of Law 622, *Introduction to American Law*.

Full-time U.S. students must complete all degree requirements within two years from the date of admission; part-time students must complete all degree requirements within three years from the date of admission. U.S. students who wish to extend the period allowed for completion of degree requirements must petition the Graduate Studies Board. Foreign students in the International Legal Studies Program are expected to complete all degree requirements in one academic year. An extension for one semester may be granted by the program director in exceptional circumstances.

### Curriculum

Candidates for the General LL.M. must complete 24 credit hours, including 4 hours of thesis, and should consult with the appropriate dean in order to design a comprehensive program of study. Students may choose to concentrate their studies in one or more areas, such as constitutional law, labor law, corporate law, and health care law.

Candidates for the degree in a specialized program must complete 24 credit hours, including 4 hours of thesis and the minimum required number of hours in courses listed below for each program. Related courses are recommended for the remaining course work. Specialized degree candidates must have their programs of study approved by the program director.

#### *Environmental Law Program*

*Director A.W. Reitze, Jr.; Faculty Advisers L. Hourclé, J. Turley*

#### *Environmental Law Courses—12 credits required*

Land Development Law (408)	Toxic Tort Litigation (455)
Clinical Studies in Environmental Law (414)	Environmental Crimes (535)
Occupational Safety and Health Legislation (415)	Environmental Crimes Project (536)
	Water Pollution Control (539)
	Air Pollution Control (540)

- Environmental Remedies (541)
- Environmental Issues in Business Transactions (542)
- Water Resources Law (543)
- Environmental Planning (544)
- Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (545)
- Natural Resources Law I (546)
- Natural Resources Law II (547)
- Control of Solid and Hazardous Wastes (RCRA & CERCLA) (548)
- Energy Law (549)
- Use and Control of Nuclear Energy (550)
- International and Comparative Environmental Law (551)

#### *Courses Related to Environmental Law*

- Mediation (303)
- Complex Litigation (308)
- Administrative Law (342)
- Regulated Industries (345)
- Planning, Zoning, and Land Use Law (402)
- Land Use Administrative Process (404)
- Products Liability (454)
- Medicine for Lawyers (470)
- Law, Science, and Technology Seminar (475)
- Government Contracts (486)
- Government Procurement Law (487)
- Practical Economics for Lawyers (500)
- Statistics and the Law (503)
- International Law of the Sea (567)
- Legislative Drafting (591)

#### *Government Procurement Law Program*

*Director J. Schwartz; Faculty Adviser F.J. Lees*

*Government Procurement Law Courses—10 credits required*

- Comparative Public Procurement (485)
- Government Contracts (486)
- Government Procurement Law (487)
- Government Contracts Seminar (490)
- Government Contracts Cost & Pricing (491)
- Clinical Studies in Government Contract Law (597)

#### *Courses Related to Government Procurement Law*

- Federal Jurisdiction (300)
- Negotiations: Concepts and Techniques (305)
- Business Planning (334)
- Labor Law (338)
- Collective Bargaining and Labor Arbitration (340)
- Environmental Law (410)
- Federal Income Taxation of Corporations and Shareholders (424)
- Labor Standards (429)
- Employment Discrimination Law (431)
- International Business Transactions (446)
- Unfair Trade Practices (450)
- Federal Antitrust Laws (452)
- Patent Law (464)
- Computer Law (468)
- Use and Control of Nuclear Energy (550)
- Legislative Drafting (591)

#### *Intellectual Property Law Program*

*Director H.C. Wegner; Faculty Adviser J. Schaffner*

*Intellectual Property Law Courses—10 credits required*

- Patent Law (464)
- Patent Policy and Practice (466)
- Licensing of Intellectual Property Rights (552)
- Chemical and Biotech Patent Policy and Practice (553)
- Comparative Patent Law Seminar (554)
- Patent Enforcement (556)
- Electronics and Computers: Policy and Practice (557)
- International and Comparative Patent Law (558)
- Copyright Law (559)
- Trademark Law (560)



*Courses Related to Intellectual Property Law*

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|--------------------------------|----------------------------------|
| Unfair Trade Practices (450)   | Computer Law (468)               |
| Federal Antitrust Laws (452)   | Government Procurement Law (487) |
| Trade Regulation Seminar (462) |                                  |

*International and Comparative Law Program*

*Director* T. Buerghenthal; *Associate Director* R. Steinhardt;  
*Faculty Advisers* J.A. Spanogle, J. Alvarez

*International and Comparative Law Courses*—12 credits required

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|--|--|
| International Commercial Law (371)                               | Law of the European Communities (561)                    |
| Comparative Law (438)  | Law of Japan (562)                                       |
| Foreign Relations, National Security, and the Constitution (443) | International Law of Human Rights (565)                  |
| International Law (444)  | International Law of Air and Space (566)                 |
| International Business Transactions (446)                        | International Law of the Sea (567)                       |
| International Organizations (447)                                | International Humanitarian Law (568)                     |
| International Arbitration (448)                                  | International Negotiations (571)                         |
| International Civil Litigation (449)                             | Foreign Direct Investment (576)                          |
| Public International Law Seminar (504)                           | Income Taxation of Foreign Business and Investment (583) |
| International and U.S. Regulation of Foreign Trade (505)         |  |

*Courses Related to International and Comparative Law*

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|---|--|
| Immigration Law (360)                                 | Comparative Public Procurement (485)     |
| Refugee and Asylum Law (361)                          | Use and Control of Nuclear Energy (550)  |
| Admiralty (386)                                       | Foreign and Comparative Patent Law (558) |
| International and Comparative Environmental Law (410) |  |
| Conflict of Laws (440)                                |  |

**Thesis Requirement**

Each candidate for the LL.M. degree must write a master's thesis (Law 599-600) under the supervision of a full-time member of the faculty of the National Law Center. Four hours of credit toward the degree is given for successful completion of the thesis. The thesis is expected to be a scholarly paper of the same quality and length as a law review article.

The thesis in its final form must be presented to the adviser no later than the date specified in the Academic Calendar. When the thesis is accepted, three copies of the final thesis are required. It is the responsibility of the candidate to obtain from the dean of student's office a printed copy of the regulations governing the style and reproduction of theses. The thesis binding fee must be paid at the time of registration for the last semester of work.

Students who are unable to finish the thesis during the semester in which they have registered for Law 600 must maintain continuous enrollment until the thesis has been completed (see Continuous Enrollment).

Accepted theses become the property of the University and are placed in the University's Gelman Library and the Jacob Burns Law Library, where duplicate copies are bound and made available for circulation.

The National Law Center encourages publication of LL.M. theses in appropriate scholarly journals with an acknowledgement that the thesis was submitted in partial fulfillment of the LL.M. degree at the The George Washington University.

### ***Thesis Waiver***

Only foreign attorneys who are candidates for the LL.M. degree may request a waiver of the thesis requirement. A candidate for the degree in a specialized field must submit the request in writing to the director of the program in that field. A student in the general LL.M. program must submit the request to the director of the International Legal Studies Program. All requests for a thesis waiver must be submitted no later than the beginning of the final semester or summer session before the student's graduation. Approval of such a request will be granted only if the student has demonstrated research and writing ability by successfully completing a substantial research paper in a course or as an independent writing project.

### **Dual Field Designation**

Students may have more than one field of specialization noted on their diplomas if they fulfill the following requirements: complete the minimum number of course credits in each program area (see Curriculum), write the master's thesis on a topic that intersects both of the program areas, receive advance approval of the thesis topic from both program directors.

### **Joint LL.M./M.P.H. Degree**

Candidates for the LL.M. in Environmental Law may pursue a joint LL.M./M.P.H. degree. Admission must be obtained separately to the LL.M. program and to the Master of Public Health program in the GW School of Medicine and Health Sciences. To be admitted, applicants must have a strong legal background and substantial training in science. More information about the requirements for the joint degree program may be obtained from the admissions offices of each school.

## **Academic Regulations**

### **Academic Work Load**

Master's candidates without substantial outside employment may take a maximum of 12 credit hours per semester. Students with more than 20 hours of outside employment must take a limited program of study not to exceed 8 credit hours. The minimum load is 4 credit hours unless approval for fewer hours is given by the dean.

### **Academic Evaluation**

#### ***Grades***

Effective fall 1993, letter grades are given with numerical equivalents as follows.

A+ = 4.33	B+ = 3.33	C+ = 2.33	D = 1.0
A = 4.0	B = 3.0	C = 2.0	F = 0
A- = 3.67	B- = 2.67	C- = 1.67	

Graduate students may not elect to take graded courses on a Credit/No Credit basis. No credit is given for grades below C- for U.S. attorneys in the program and for grades below D for foreign attorneys. A student who has been excused from taking a regularly scheduled examination is given the grade of I, Incomplete. A student who fails to take an examination and is not excused receives a grade of F. See Examinations, below, for rules governing makeup examinations.

The cumulative average of a student includes all grades in all courses taken while a candidate for a given degree.

No grade may be changed by an instructor after it has been posted in the Law Center or disclosed to a student unless there has been an arithmetic or administra-



tive error that has been certified in writing by the instructor. A student has the right of faculty peer review of complaints of "capricious or prejudiced academic evaluation" under the regulations outlined in *The George Washington University Guide to Students' Rights and Responsibilities*.

### Honors

The degree of Master of Laws "With Highest Honors" is awarded students who obtain a minimum cumulative average of 3.67.

### Examinations

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. If a student fails to take an examination, a grade of F will be recorded unless the student has been excused from the examination or has obtained the dean's permission to drop the course. No excuse for absence will be granted except by the dean and then only for illness or other emergency. Application for excuse must be made in writing as soon as possible but not later than one month after the date of the examination. A student who has received an excused absence for a graded course has two options. The student may comply (prior to the completion of the semester following the excused absence) with the instructor's procedure of evaluation on a Credit/No Credit basis (for credit, a minimum grade of C- is required for U.S. LL.M. candidates, D for foreign candidates) or the student may have the grade of I (Incomplete) entered on the record and take the next regularly scheduled examination for a letter grade. Permission to take an examination before the regularly scheduled date and time will not be granted.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to next regular examination in the subject may petition the Graduate Studies Board, which may authorize such action as the circumstances require.

### Research Papers

The preparation of a research paper is required in lieu of an examination in seminars and other courses, as indicated in the course descriptions. To receive a letter grade on a research paper, the paper must be submitted by the last day of classes in the semester or, with the permission of the instructor, by the last day of the examination period (the last day of any examination given in any course). For sufficient reason, the instructor may extend the deadline up to the last day of the examination period of the following semester, if the extension is to a date beyond the normal graduation date for the student, the express permission of the dean is required. When the deadline for a paper is extended, the following conditions apply: (1) no student will receive any credit for the course until a paper acceptable to the instructor has been submitted, (2) the only grade the student may receive for the course is CR (Credit) or NC (No Credit). To receive credit, a minimum grade of C- is required for LL.M. candidates (D for foreign candidates). Failure ultimately to submit any paper for the course will result in a grade of F.

### Changes in Program of Study

Master of Laws candidates may make changes in their class schedules during the first two weeks of classes. After that time, students may not add courses and may drop courses only with the approval of the instructor and the dean. Under no circumstances may a student drop a course after the last day of classes in any semester.

### **Credit for Courses Taken in Other Departments**

Master of Laws candidates may be permitted to take graduate courses related to their fields of interest in other departments of this University. A maximum of 6 credit hours will be credited toward the degree for such courses. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses; a student must earn a grade of at least *B* to receive a Credit.

### **Consortium of Universities of the Washington Metropolitan Area, Inc.**

A candidate for the Master of Laws degree may take graduate courses at Georgetown University Law Center through the Consortium of Universities of the Washington Metropolitan Area. A maximum of 6 credit hours of such courses may be credited toward the master's degree. Permission to take Consortium courses must be granted by the dean, the registrar, and the instructor offering the course. The grade of *CR* (Credit) or *NC* (No Credit) will be recorded for such courses. To receive the grade of *CR* a student must attain a grade of *C* or higher.

### **Continuous Enrollment**

Degree candidates are expected to maintain continuous enrollment until all degree requirements are satisfied. Students who have previously enrolled in Law 599-600, *Thesis*, and have not completed their thesis must continue to be enrolled each semester up to and including the semester of their graduation. A student who fails to register for one semester or more is dropped from the University's registration rolls and must apply to the law school for readmission.

### **Readmission**

A student who fails to register for one or more semesters will be required to apply for readmission in order to continue in the degree program. Application for readmission should be made to the Graduates Studies Board. Readmitted students will not receive academic credit for coursework completed more than five years prior to the date of the readmission request. Petitions for exceptions to this policy should be addressed to the Graduate Studies Board and will be granted only in exceptional circumstances.

### **Attendance**

Regular attendance at classes is required and is necessary for successful work. A student who is shown by the instructor to be deficient in class attendance or participation may be withdrawn from a course administratively.

## **The Doctor of Juridical Science Degree**

Programs leading to the degree of Doctor of Juridical Science offer a very small number of unusually talented students, who have already earned the Master of Laws degree, the opportunity to concentrate on research and writing in a specific area of interest.

### **Entrance Requirements**

#### **U.S. Attorneys**

Admission to the Doctor of Juridical Science degree program requires a Bachelor of Arts or equivalent degree from an approved college or university; a Juris Doctor or equivalent degree, earned with high rank, from a law school that is a member of the Association of American Law Schools (AALS) or is approved by the American Bar



Association (ABA); a Master of Laws degree with high academic standing; outstanding capacity for scholarly work in the field of law; and faculty approval of the applicant's dissertation topic. Applicants must demonstrate their writing ability by submitting the master's thesis or a copy of one or more papers or articles that the applicant has written. Following consultation with the dean, the applicant must obtain a faculty adviser, to be designated committee chairman, from the regular, full-time faculty; reach agreement on the acceptability of the proposed topic for the dissertation; and submit a detailed outline for the adviser's approval, indicating by chapter and division within chapter the exact scope of the project. There should be a bibliography for each chapter, listing books, reports, cases, and law review articles to be considered. Although the outline cannot predict every detail of the subsequent research, it must be sufficiently definite to afford the Graduate Studies Board a basis for evaluation.

Once the outline is approved, the applicant's committee is expanded to three members; this consultative committee must recommend the acceptance of the applicant to the full Graduate Studies Board. The Board then acts upon the recommendation and may either accept or reject the applicant as an S.J.D. candidate. In no instance will any applicant be admitted to degree candidacy prior to the above procedures; however, the applicant may be registered as an unclassified student for purposes of completing the 8 credit hours of course work requirements (see below). Approval for degree candidacy must be received within one year of the appointment of an adviser unless a written extension is granted by the dean.

### Foreign Attorneys

To be considered for admission to the Doctor of Juridical Science degree program, individuals who received their first law degree outside the United States must have obtained an LL.M. or its equivalent with highest honors from a duly accredited (ABA or AALS) American law school and their first law degree with comparable honors.

Admission to the S.J.D. program will be limited to a very small number of the most qualified applicants whose research proposals are determined to be of special interest to one or more members of the regular, full-time faculty. Applicants must, therefore, submit with their application a letter outlining their S.J.D. research plans.

### Degree Requirements

Candidates for the Doctor of Juridical Science degree must complete the following requirements in order to be awarded the degree: A residence period of not less than one academic year; a course of study and research, designated by the dissertation committee, of no less than 8 credit hours; and completion and acceptance of a dissertation (see below).

### The Dissertation

The dissertation must be submitted no later than three years from the date of admission to candidacy for the S.J.D. degree. The applicant who proposes to write on a comparative law topic must have a reading knowledge of the language in which the relevant materials are to be found. When the dissertation is submitted, the consultative committee will set the date for oral examination. This examination is conducted by the consultative committee and such other members of the faculty and qualified experts as are selected by the Graduate Studies Board.

No later than the date specified in the Academic Calendar, the candidate must submit to the dean two complete copies of the dissertation and two copies of an abstract of the dissertation.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation and preparation of the abstract are available in the Office of the Dean. To be acceptable, the dissertation must, in the opinion of the examining committee, constitute a substantial contribution to the field of law concerned and

be suitable for publication. Additional information will be supplied by the dean. Accepted dissertations become the property of the University and are placed in the University's Gelman Library and the Jacob Burns Law Library, where duplicate copies are bound and made available for circulation.



## Fees and Financial Regulations

The following fees and financial regulations were adopted for the 1993 summer sessions and the 1993-94 academic year.

### Tuition Fees

#### J.D. candidates:

Full-time program (11 or more credit hours), each semester .....	\$9,200
Part-time program, each credit hour .....	650
Master's degree candidates, each credit hour .....	650
Continuing Legal Education students, each credit hour .....	650
S.J.D. candidates,* full program, including the final examination .....	18,400*

University Fee (charged all students registered on campus)—\$29.50 per credit hour, to a maximum of \$295 per semester.

#### Special Fees and Deposits (Nonrefundable)

Application fee (degree candidate) .....	55
Tuition deposit fee charged each student admitted to J.D. degree candidacy (payable in two installments—\$100 by a date specified in the letter of admission; \$500 by mid-June) .....	600
Tuition deposit fee charged each student admitted to LL.M. degree candidacy (payable on the date specified in the letter of admission) .....	500
Late registration during the first week of the semester .....	75
Late registration after the first week of the semester .....	125
Cap and gown fee (charged all students who choose to participate in commencement exercises) .....	50
Fee for binding master's theses and S.J.D. dissertations .....	30
Late-payment fee, (see Payment of Fees, below) .....	50
Replacement of lost or stolen picture identification card .....	25
Returned check fee, charged a student whose check is returned because of insufficient funds or for any other reason .....	25
Transcript fee .....	3
Replacement of diploma fee .....	50

Registration on campus in the University entitles each student to the following privileges: the services of the Career Center; the use of the University library; gymnasium privileges; and admission to all athletic contests, unless otherwise specified.

\* The tuition fee is to be paid at the rate of \$4,600 per semester for four successive semesters, exclusive of the summer term or terms. If the Faculty should approve an extension of time, the student must maintain enrollment.



These privileges terminate and a student is no longer in residence upon withdrawal or dismissal from the University.

### Payment of Fees

When the student registers for courses to be taken in the forthcoming semester, a Schedule and Statement form is generated and mailed to the student. It provides information on due dates, cancellation dates, and all charges; it must be returned to the Cashier's Office by the stated due date to avoid cancellation of registration or imposition of additional fees.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. Students registered for 6 credit hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration, permitting them to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half by Wednesday of the eighth week of classes for the fall and spring semesters. Interest at the rate of 12 percent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. A 10-month payment plan is also available.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by \$3,000 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment plan.

Students who fail to make any payment when due will be automatically charged a \$50 late-payment fee and will be subject to the interest charge of 12 percent per annum. Accounts that become 15 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits rights to the use of deferred payment in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled. In addition, applications for institutional and federal financial aid cannot be processed until all encumbrances, including those for unpaid emergency loans, have been paid. Accounts that must be referred to a collection service will be assessed all collection costs, including fees charged by the collection agency.

Students auditing courses are subject to all fees charged to students registered for credit.

**Returned Check Policy**—A student whose check is returned unpaid by the bank for any reason will be charged a returned check fee. If the check is not paid within 15 days, the student's account will be financially encumbered, with the same restrictions and penalties as for late payment enumerated above.

### Prepaid and Deferred Payment Plans

Several commercial programs are available for those who wish to pay the costs of their education on a monthly basis. Terms and conditions vary, but most provide a life insurance policy in the contract. For specific details and applications, address inquiries to the following:

Mellon Bank Edu-Check Plan, P.O. Box 8888, Wilmington, Del. 19899

Richard C. Knight Insured Tuition Plan, 53 Beacon Street, Boston, Mass. 02108

School-Chex, Irving Trust Company, 61 Broadway, New York, N.Y. 10007

Educational Loan Program, The Riggs National Bank, 1913 Massachusetts Ave., N.W., Washington, D.C. 20035

The Tuition Plan, Inc., Concord, N.H. 03301

Tuition Line, Maryland National Bank, Consumer Banking Division, P.O. Box 1954, Baltimore, Md. 21203

## Withdrawals and Refunds

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the dean. Withdrawal from courses is permitted after the midpoint of a semester only in extraordinary circumstances. Notification to an instructor is not an acceptable notice.

In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule for the fall and spring semesters.

### 1. *Complete withdrawal from the University:*

Withdrawal dated on or before the end of the first week of the semester .....	80%
Withdrawal dated on or before the end of the second week of the semester .....	60%
Withdrawal dated on or before the end of the third week of the semester .....	40%
Withdrawal dated on or before the end of the fourth week of the semester .....	25%
Withdrawal dated after the fourth week of the semester .....	None

2. *Partial withdrawal:* If the change in program results in a lower charge, the refund schedule above applies to the difference.
3. Regulations governing student withdrawals as they relate to residence hall and food service charges are contained in the specific lease arrangements.

The above information regarding cancellation of tuition charges and fees after withdrawal from the University may not apply to entering students who are recipients of federal aid; those students should check with the Student Accounts Office for the applicable cancellation schedule.

Refund policies of the University are in conformity with guidelines for refunds as adopted by the American Council on Education.

In no case will tuition be refunded or reduced because of absence from classes.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make banking arrangements in the community.



## Financial Aid

The National Law Center assists many students in obtaining financial aid through grants, various loan programs, or a combination of these kinds of assistance.

### Juris Doctor Program

Entering students wishing to receive financial aid should file the Graduate and Professional School Financial Aid Service (GAPSFAS) and the Free Application for Federal Student Aid (FAFSA) forms after January 1. These forms are available at most university financial aid offices. The information provided by the applicant and the applicant's parents will be analyzed, and a copy of the financial need report will be sent to the Law Center.

Students seeking financial assistance should file FAFSA and GAPSFAS forms in time for their reports to be received at the Law Center as early as possible. University funds will be awarded on the basis of financial need. In determining financial need, the Financial Aid Office considers information provided by FAFSA and GAPSFAS, and Federal tax returns. The Committee on Student Financial Aid of the Law Center will begin making awards in March, and available funds are limited.

No awards will be made to an entering student until the admission process has been completed.

### Sources of Financial Aid

Financial aid has been made available from many friends and alumni of the Law Center. The scholarships include the following:

Arent, Fox, Kintner, Plotkin & Kahn  
Scholarship  
Mildred Gott Bryan Scholarship  
Jacob Burns Honor Scholarship  
Charles Worthington Dorsey  
Memorial Scholarship  
Granoff Family Foundation  
Scholarship  
Samuel Green Phi Delta Phi  
Scholarship  
Patricia Roberts Harris Scholarship  
Howrey and Simon Scholarship  
Hunton and Williams Scholarship

Thomas Searing Jackson Scholarship  
Jacob and Charlotte Lehrman  
Foundation Scholarship  
Manatt-Phelps Banking Law Scholarship  
Robert Netherland Miller Scholarship  
Phi Delta Delta Scholarship  
Donald C. Snyder Scholarship  
William Pinckney Walker Memorial  
Scholarship  
Frank S. Whitcomb Scholarship  
Glen A. Wilkinson Scholarship  
J. McDonald and Judith K. Williams  
Scholarship

### Loan Funds

Through the generosity of friends of the University, a number of loan funds are available. Among them are the Lyle T. Alverson Loan Fund; the Robert Ash Loan Fund; the George R. Beneman Loan Fund; the Morris and Gwendolyn Cafritz Foundation Minority Law Student Loan Fund; the Robert M. and Mary McConnel Cooper Loan Fund; the Robert McKinney Cooper Memorial Loan Fund; the Mitchell S. Cutler Memorial Loan Fund; the J. Forrester Davison Loan Fund; the Clifford A. Dougherty Fund; the District of Columbia Bar Association Loan Fund; the J.W. Ehrlich Foundation Loan Fund; the Newell W. Ellison Loan Fund; the Louise F. Freeman Memorial Student Loan Fund; the Harold L. and Violet George Foundation Loan Fund; the George Washington Law Association Loan Fund; the Morris Golub Loan Fund; the Frederick O. Graves Law Student Loan Fund; the John B., Jr., and Carol H. Holden Loan Fund; the Jephson Educational Trust Loan Fund; the Susan and Anne Kondrup Memorial Fund, the Law Association Loan Fund for the law classes of 1912, 1918, 1921, 1924, 1929, 1931, 1933, 1935, 1936, 1937, 1938, 1939, 1941, 1942, 1945, 1950, 1951, 1952, 1953, 1955, 1959, 1960, 1961, 1962, 1963, 1964.

1965; the Law School Loan Fund; the Oscar Lawler Memorial Loan Fund; the Horace L. Lohnes Memorial Assistance Fund; the Jessie B. Martin Loan Fund; the Robert N. Miller Loan Fund; the Joan Murphy Loan Fund; the Nu Chapter, Kappa Beta Pi Legal Association International Loan Fund; the Mike Pelekiri Loan Fund; the Phi Delta Delta Loan Fund; the W. Theodore Pierson Loan Fund; the Rockport Loan Fund; the Samuel L. Samuel Loan Fund; the H. William Tanaka Law Students Assistance Loan Fund; the Orville Hassler Walburn Memorial Loan Fund; the Kennedy and Judith Watkins Law Student Loan Fund; the Ralph E. West Memorial Loan Fund; the W.H. Williams Memorial Student Loan Fund; the Patricia A. Willoner Loan Fund; the Ruth F. Wilson Loan Fund; the Yadao and Kanemoto Loan Fund; and the Samuel Green Memorial Loan Fund.

### **Master's and Doctoral Programs**

Sources of financial aid include the Richard Paul Momsen Scholarships for Brazilian Graduate Law Students for the study of U.S. constitutional law and the law of patents and trademarks, the Randolph C. Shaw Graduate Fellowship in Environmental Law, the Randolph C. Shaw Fellowship in Legal Research and Writing, and Graduate Honor Fellowships.

Application for these programs should be made by March 1. The applicant should submit a letter specifically applying for one of the above programs to the Financial Aid Office. The letter should contain biographical data, information concerning experience in practice or teaching, and any other information that will be of assistance in the consideration of the application.

Students applying for financial aid on the basis of financial need should follow the same guidelines outlined for Juris Doctor candidates.

### **Veterans Benefits**

The veterans counselor, located on the third floor of Rice Hall, 2121 I Street, N.W., assists students entitled to educational benefits as veterans or as widows or children of deceased or totally disabled veterans with any problems that may arise concerning their benefits. This office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or dependents of veterans should consult with the veterans counselor prior to submitting an application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration and which includes other information of general interest. The Veterans Administration is at 941 N. Capitol St., N.E., Washington, D.C. 20421.



## Prizes

*Anne Wells Branscomb Prize*—Awarded to the member of the graduating class who attained the highest grade in the entire course of the evening division for the degree of Juris Doctor.

*Bureau of National Affairs Law Student Prize*—Presented to an outstanding senior law student.

*Jacob Burns Prize*—Established by Jacob Burns, a law alumnus and Honorary Trustee of the University. A medal and a cash award presented annually to each of the two members of the winning team in the upper-class Van Vleck Moot Court competition.

*The Michael D. Cooley Memorial Prize*—A plaque given to that individual in each graduating class who has been most successful in maintaining his or her compassion, vitality, and humanity during law school. The recipient of this award is selected by the graduating class.

*The Deans' Exceptional Service Prize*—Awarded for outstanding service to the community and to the nation.

*Ogden W. Fields Graduate Prize*—Awarded annually to the student who has demonstrated the highest overall proficiency in labor law.

*Finnegan Prize in Intellectual Property Law*—Established by the law firm Finnegan, Henderson, Farabow, Garrett, and Dunner. A cash award to a J.D. or LL.M. student for the best publishable article on an aspect of intellectual property law.

*Willard Waddington Gatchell Prize*—By bequest of Eona Burnett Gatchell in memory of her husband, a cash award presented annually to the three members of the graduating Juris Doctor class who attained the highest cumulative averages in the entire course for the degree of Juris Doctor.

*Charles Glover Prize*—Established by Charles Carroll Glover, Jr., an Honorary Trustee of the University, in memory of his great-grandfather, an illustrious member of the bar of the District of Columbia. A cash award given annually to the student who has attained the highest average grade in the third-year, full-time course.

*Kappa Beta Pi Prize*—Awarded by Eta Alumnae Chapter to the law student who attains the highest average for the first year.

*John Bell Larner Prize*—By bequest, a plaque awarded annually to the member of the graduating class who attains the highest average grade in the entire course of the degree of Juris Doctor.

*John Ordronaux Prizes*—By bequest, awarded annually to the student who has attained the highest average grade in the first-year, full-time course and to the student who has attained the highest cumulative average grade at the end of the second-year, full-time course.

*Richard L. Teberg, J.D. 1964, Prize*—Awarded annually to that graduate of the J.D. program who has demonstrated the highest overall proficiency in the courses in securities law.

*Jennie Hassler Walburn Prize*—A cash award to the outstanding students in the field of civil procedure, established by the will of the late Professor Orville Hassler Walburn in memory of his mother.

*Imogen Williford Constitutional Law Prize*—Established by Imogen Williford, J.D. 1929. A cash award presented to the outstanding student in the field of constitutional law.

## General Information

### Day and Evening Classes

Day classes are scheduled between 9-10 a.m. and 5-50 p.m., Monday through Friday. The majority of evening classes meet from 5-50 to 7-40 p.m., Monday through Friday.

A four-credit course, e.g., *Evidence*, meets two evenings a week; most 3-credit courses, e.g., *Administrative Law*, meet one evening a week plus alternate Friday evenings throughout the semester; a 2-credit course, e.g., *Contracts II*, meets one evening a week. The evening division conforms to the academic standards of the day division, with full-time faculty teaching all courses in the required and core curriculum.

Examinations for both day and evening classes may be given in the afternoon. Examinations for day students may be given in the evening.

### Summer Session

One session is offered in the summer. No beginning students are admitted to the Juris Doctor degree program in the summer session. Students who attend the summer session receive fractional residence credit.

### Registration

Each student must register before attending classes. No student will be registered until proper credentials have been filed (see Admission).

No registration is accepted for less than a semester or summer session. A student may not register concurrently in George Washington University and another institution. Registration in more than one school of the University requires the written permission of the deans concerned, prior to registration.

### Eligibility for Registration

A student who is suspended or whose record is not clear for any reason is not eligible to register.

**New Student**—Upon receipt of a final letter of admission a new student is eligible for registration on the stated days of registration.

**Readmitted Student**—A student previously registered who was not registered for courses during the preceding semester or summer session and who has not been granted a leave of absence must apply for and receive a letter of readmission before becoming eligible for registration.

### Graduation Requirements

Diplomas are awarded in January, May, and September.

To be recommended by the faculty for graduation, a student must have met the admission requirements of the National Law Center, completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which the student is registered, and be free from all indebtedness to the University. Registration is required for the semester or summer session at the close of which the degree is to be conferred.

**Application for Graduation**—An application for graduation must be filed by the date indicated in the Academic Calendar during the last semester or summer session of the final year. Students completing degree requirements during the summer session and fall semester will be awarded diplomas (no formal convocation) on September 30 and January 30, respectively, provided they have completed all degree requirements and have applied for graduation as part of registration. If they wish, such students may participate in the May Commencement.



## Transcripts of Record

Official transcripts of student records will be issued by the Office of the Registrar on request of the student or former student who has a clear financial record. A fee of \$3 is charged for each transcript.



## Student Activities and Student Life

### Enrichment Program

The Law Center supplements and enriches its diverse law programs by bringing to the school eminent legal scholars, judges, distinguished members of the bar, members of Congress, and high-level government officials to offer lectures and informal seminars with students and faculty. Participants in the Enrichment Program have included columnist Anthony Lewis, Supreme Court Justices Lewis Powell, Antonin Scalia, Sandra Day O'Connor, Anthony Kennedy, and Harry Blackmun, CIA Director William Webster, Yale University President Benno Schmidt, Senator Bill Bradley, former U.S. Attorney Rudolph Giuliani, Dean Guido Calabresi of Yale Law School, Judge Richard Posner of the U.S. Court of Appeals for the Seventh Circuit, and Professor Ronald Dworkin of Oxford University. The Enrichment Program, funded largely by gifts from alumni and friends of the Law Center, includes several endowed lectureships and a visiting scholar program.

### Publications

The *George Washington Law Review*, published six times a year, is edited and managed by the students of the National Law Center. The *Law Review* is known for its emphasis on federal and public law; however, it is also devoted to research in other important legal areas. The staff of the *Law Review* is selected on the basis of grades and a writing competition. The editorial board is selected from those students who have successfully completed the first year of *Law Review* work. Students receive 4 credit hours of academic credit for the two-year program.

The *George Washington Journal of International Law and Economics* is managed and edited by law students. It presents articles and commentaries on public and private international financial development, comparative law, and international law. The staff of the *Journal* is selected on the basis of criteria identical to those used by the *Law Review*, and students earn up to four credit hours of academic credit for their work.

### Moot Court

The moot court competitions and programs provide realistic training in appellate and trial advocacy. The Moot Court Board, which administers appellate moot court programs at the National Law Center, is a student organization dedicated to promoting excellence in written and oral advocacy. The Board sponsors the Van Vleck Appellate Moot Court Competition, the Jessup Cup competition in international law, and the Giles S. Rich competition in patent law. In addition, the Board sends student teams to interscholastic competitions across the nation. The Student Trial Lawyers Association sponsors an intrascholastic trial competition and sends stu-

dent teams to interscholastic trial competitions nationwide. Each year the National Law Center sponsors the Harold H. Greene and Joyce Hens Green National Security Law Moot Court Competition.

### **Law Center Student Organizations**

#### *The Advocate*

Amnesty International Legal Support Group

Asian-Pacific American Law Student Association

Black Law Student Association

Christian Law Association

Entertainment and Sports Law Society

Environmental Law Association

Equal Justice Foundation

Federalist Society

Gay and Lesbian Law Association

GW Republican Student Lawyers Association

International Law Society

International Legal Studies Student Association

Jewish Law Student Association

Law Association for Women

Law Fraternities and Sororities

Law Students for the Arts

Moot Court Board

Movimiento Legal Latino

National Lawyers Guild

Street Law

Student Bar Association

Student Health Law Association

Student Intellectual Property Law Association

Students for the Public Interest Now

Student Trial Lawyers Association



## **Facilities and Services**

### **The National Law Center**

The Law Center is comprised of three adjoining buildings: Theodore N. Lerner Hall, Stockton Hall, and the Jacob Burns Law Library. Lerner Hall is a modern and innovative teaching facility. Its five levels contain classrooms, the dean's suite, and the Moot Court Room. Four of its eight classrooms are constructed in amphitheater style and are equipped with advanced sound systems and full video and viewing capabilities. Stockton Hall contains administrative offices, the Community Legal Clinics, classrooms, faculty offices, a reading room, a media center, and a student lounge. The Jacob Burns Law Library houses faculty and student organization offices and a computer room as well as its extensive collection.

### **The Jacob Burns Law Library**

The Jacob Burns Law Library houses a comprehensive 400,000-volume collection of predominantly Anglo-American law materials to support the research needs of National Law Center faculty and students. The library also maintains a substantial collection of international law materials with emphasis on the areas of human rights and international organizations. In 1978, the Law Library was designated a U.S. Government Depository Library; much of its extensive and heavily used government documents collection dates from that time.



The library's large treatise collection includes law materials as well as law-related interdisciplinary works in the areas of business, economics, sociology, criminology, political science, and foreign affairs. Especially strong collections have been developed in the areas of environmental law, intellectual property, international law, government contracts, taxation, and labor law. The periodicals collection is rich and varied, ranging from the major law journals to specialized law reviews and contemporary interdisciplinary journals. On-line databases providing access to numerous law and law-related information sources, such as LEXIS/NEXIS, WESTLAW, DIALOG, OCLC, ALADIN, and the library's own automated catalog, JACOB, are available for searching in the library. Through an active interlibrary loan program, librarians obtain materials from other libraries for students and faculty engaged in research.

A staff of approximately 30 librarians and library assistants administers and maintains the library and offers information, instruction, and other research support services. The *Library Guide*, available at the circulation desk, describes library services and policies, and lists hours of operation, collection locations, and other pertinent information.

National Law Center student and faculty researchers are welcome at the two other George Washington University libraries, the Gelman Library (undergraduate/graduate) and the Himmelfarb Library (medical/health sciences). When additional resources are necessary, researchers may gain access to collections at other major Washington libraries, including academic libraries as well as the Library of Congress.

### **Career Development and Placement Services**

The Career Development Office provides a full range of services to support the career decision-making process. Students, graduates, and prospective employers are served through a variety of programs, including systems of job-vacancy advertising; newsletters of current career information; individual and group counseling on resume preparation, interviewing skills development, and job-search strategy; a career resource library; and forums and panel presentations covering legal career topics as well as employment options.

### **Continuing Legal Education**

Members of the Bar who wish to keep abreast of current developments in the law may register for any of the courses in the National Law Center on a noncredit basis as Continuing Legal Education students. Specific courses are also open to non-lawyers whose special qualifications justify their registration. Such students do not take examinations in courses and no grades are recorded for their work.

A simplified admission and registration procedure is used and must be completed on or before the last day of regular registration for the appropriate semester. Continuing Legal Education students pay only the tuition fee on the semester-hour basis. They may not participate in student activities or benefit from the medical privileges of the University. (Continuing Legal Education registrations are subject to cancellation if courses are filled by regularly registered students.)

### **Housing**

The University does not provide regular residence hall space for graduate students. However, the Residential Life Office refers graduate students to apartments as they become available in University-owned buildings in the campus area. Additionally, the University's Off-Campus Housing Resource Center can provide information and assistance for those seeking accommodations.

## **Food Service**

Contract food service is available from August to May, based on the undergraduate academic calendar of registration, exams, and vacation periods. Accommodations for the law school calendar are made. Rates for the various meal plans are available from the Residential Life Office. Contract service is cafeteria style and provided in two residence halls and the Cloyd Heck Marvin Center. Meal coupons may also be used on a cash-equivalency basis in the cafeteria on the first floor of the Marvin Center and in George's on the fifth floor.

## **The Cloyd Heck Marvin Center**

The Cloyd Heck Marvin Center serves as the campus community center, providing services, conveniences, and recreational and social opportunities for students, faculty, staff, alumni, and guests. Its wide range of facilities provides the setting for a variety of programs conducted by the University Program Board, the departments offering course work in the performing arts, and other student and faculty organizations. The Center Governing Board, representing varied segments of the University community, plays an important role in the day-to-day functioning of the Center. This Board works closely with the full-time staff in the development of procedures and policies that provide a framework for the Center's operation.

## **The Charles E. Smith Center**

The Charles E. Smith Center for Physical Education and Athletics offers many facilities for student use, including courts for basketball, volleyball, and badminton; a jogging track, a swimming pool, wrestling, gymnastic, and weight rooms; handball and squash courts; and a sauna and lockers.

## **Student Health Service**

The Student Health Service is an outpatient clinic located at 2150 Pennsylvania Avenue, N.W. (entrance on 22nd Street)

The Health Service is staffed by physicians, nurse practitioners, and physician assistants who are capable of addressing most of students' medical problems. Visits may be either arranged by appointment or, during certain hours, secured on a walk-in basis. Most routine laboratory tests may be performed in the Health Service lab at cost, many common medications are stocked to fill students' prescriptions, and allergy shots and immunizations are administered by the staff nurse for a minimal charge. A psychiatrist works in the Health Service to assist students with mental health concerns.

For serious emergencies occurring during hours when the Student Health Service is closed, students may go to the Emergency Room of the University Hospital for treatment. This arrangement is for emergency care only and all fees are the responsibility of the student.

Students must be currently enrolled on campus in the University to receive treatment at the Student Health Service. Students enrolled in off-campus programs and the Continuing Legal Education Program are not eligible. Students who so desire may engage physicians and nurses of their own choice, but these students will be responsible for all fees charged. The bills incurred from all services rendered outside the Student Health Service (for example, x-ray work, laboratory work, and referrals to specialists or other outside physicians) are the responsibility of the student.

## **Health and Accident Insurance**

The University recommends that all students be covered by health and accident insurance. For information on group health insurance options offered through the



University, students should contact the Student Health Service or Office of the Dean of Students.

### **Disabled Student Services**

The Director of Disabled Student Services coordinates advising, orientation, and special services that address the needs of disabled students. The Director also serves as a central point of contact from which the University community may obtain information and assistance in serving disabled students. A resource library maintained in the office is available for general use.

In addition to coordinating a program of general assistance to promote integration of disabled students as fully as possible into the life of the University community, the Director administers reading and sign language services for those with visual and auditory handicaps.

The office is located on the fourth floor of Rice Hall, 2121 I Street, N.W.



## **University Regulations**

### **University Policy on Equal Opportunity**

George Washington University does not unlawfully discriminate against any person on the basis of race, color, religion, sex, national origin, age, handicap, veteran status, or sexual orientation. This policy covers all programs, services, policies, and procedures of the University, including admission to educational programs and employment. The University is also subject to the District of Columbia Human Rights Law.

Inquiries concerning the application of this policy and federal laws and regulations regarding discrimination in education or employment programs and activities may be addressed to Susan B. Kaplan, Assistant Treasurer for Legal Matters, George Washington University, Washington, D.C. 20052, (202)994-6503, or to the Assistant Secretary for Civil Rights of the U.S. Department of Education.

### **Academic Dishonesty**

The University community, to fulfill its purposes, must establish and maintain guidelines of academic behavior. All members of the community are expected to exhibit honesty and competence in their academic work. Incoming students have a special responsibility to acquaint themselves with, and make use of, all proper procedures for doing research, writing papers, and taking examinations.

Members of the community will be presumed to be familiar with the proper academic procedures and held responsible for applying them. Deliberate failure to act in accordance with such procedures will be considered academic dishonesty. Acts of academic dishonesty are a legal, moral, and intellectual offense against the community and will be prosecuted through the proper University channels.

Copies of the University policy on academic dishonesty can be obtained from the following offices: all department chairmen, all academic deans, and the Vice President for Academic Affairs.

## University Policy on the Release of Student Information

The Family Educational Rights and Privacy Act of 1974 applies to institutional policies governing access to and release of student education records maintained by educational institutions that are recipients of federal funds. The University complies with this statute, which states, in part, that such institutions must:

1. afford students access to education records directly related to them;
2. offer students an opportunity for a hearing to challenge such records as **inaccurate, misleading, or otherwise inappropriate**;
3. receive the student's written consent before releasing information from his or her education records to persons outside the University, except for directory information as indicated below. Information may be furnished to a student's parents without such written consent only upon certification of **the student's financial dependency; and**
4. comply with a judicial order or lawfully issued subpoena to release a student's record, **notifying the student of this action.**

The University will release the following directory information upon request: name, local address, and telephone number; name and address of next of kin, dates of attendance; school, college, or division of enrollment, field of study; credit hours earned; degrees earned, honors received, participation in organizations and activities chartered or otherwise established by the University (including intercollegiate athletics); and height and weight of members of athletic teams. A student who does not wish such directory information released must file written notice to this effect in the Office of the Registrar at the beginning of each semester or session of enrollment.

Copies of the University's full policy statement on the release of student information may be obtained from the Office of the Registrar.

## Right to Change Rules

The University and its college, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

## Right to Dismiss Students

If a student knowingly makes a false statement or conceals material information on an application for admission, registration form, or any other University document, the student's registration may be canceled and the student will be ineligible (except by special action of the faculty) for subsequent registration.

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes whenever, in the interest of the student or the University, the University Administration deems it advisable.

## Right to Make Changes in Programs

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

## Property Responsibility

The University is not responsible for the loss of personal property. A Lost and Found Office is maintained on campus in the Safety and Security Office.

## Student Conduct

All students upon enrolling and while attending The George Washington University are subject to the provisions of the *Guide to Student Rights and Responsibilities*,



which outlines student freedoms and responsibilities of conduct, including the Code of Student Conduct, and other policies and regulations as adopted and promulgated by appropriate University authorities. Copies of these documents may be obtained at the Office of Judicial Affairs. Sanctions for violation of these regulations may include permanent expulsion from the University, which may make enrollment in another college or university difficult. Regulations or requirements applicable only to a particular program, facility, or class of students may not be published generally, but such regulations or requirements shall be published in a manner reasonably calculated to inform affected students.

### **University Policy on Drugs**

The University cannot condone violations of the law, including violation of those laws that proscribe possession, use, sale, or distribution of drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

## Courses of Instruction

### Career Planning and Course Selection

One of the great strengths of the National Law Center is the diversity of its course offerings and the flexibility it offers students to design their programs to fit their interests and career plans. Every spring a series of counseling sessions is held to provide students with an overview of course offerings in various areas of the law and to assist them in selecting courses and defining their career objectives. Students also may consult members of the faculty for course and career planning. In addition, the Career Development Office provides a central storehouse of information regarding many types of legal careers.

While the curriculum after the first year is largely elective, the faculty believes that exposure to certain course work is important. Consequently, the faculty strongly recommends that all students take *Administrative Law* (342), *Corporations* (325), *Federal Income Taxation* (420), and *Trusts and Estates I* (390).

The faculty also believes that a generalist J.D. program would normally include most of the following courses and recommends that students take most of them prior to graduation: *Conflict of Laws* (440), *Federal Antitrust Law* (452), *Labor Law* (338), *Remedies* (380), and one or more of the following: *Commercial Paper—Payment Systems* (372), *Creditors' Rights and Debtors' Protection* (378), and *Sales and Sales Financing* (370). In addition, the faculty believes that students should consider taking a course that will provide a cross-disciplinary perspective on the law, such as *American Legal History* (318), *Comparative Law* (438), *Jurisprudence* (442), and *Law, Science, and Technology* (475).

The Law Center's broad offering of elective courses is listed below by subject area. Within each area, courses are in numerical order. Courses numbered 500 and above are generally more advanced but are open to second- and third-year students who have taken the prerequisite courses. Students may wish to consult with faculty about the order in which courses should be taken.

The courses of instruction listed below are subject to change. The University reserves the right to withdraw any course announced.

### Elective Courses and Seminars

Courses marked with an asterisk are not offered during academic year 1993–1994.

#### **Alternative Dispute Resolution**

Mediation (303)

Negotiation: Concepts and Techniques (305)

Client Interviewing and Counseling (306)

Advanced Oral Advocacy (313)

International Arbitration (448)\*

International Negotiations (571)\*

Administrative Advocacy Clinic (493)

Immigration Clinic (494)

Law Students in Court (495)

Civil Rights Externship (496)

Civil and Family Litigation Clinic (497)

Legal Activism (498)

Federal, Criminal, and Appellate Clinic (499)

Environmental Crimes Project (536)

Graduate Outside Placement (596)

#### **Clinical Programs**

Clinical Studies in Environmental Law (414)

Consumer Mediation Clinic (460)

Small Business Clinic (461)

Outside Placement (463)

Prisoners Project (476)

National Center for Law and the Deaf

Clinical Education Activities (483)

Intensive Clinical Placement (492)

#### **Commercial, Consumer, and Banking Law**

Banking Law I (332)

Banking Law II (333)\*

Sales and Sales Financing (370)

International Commercial Law (371)

Commercial Paper—Payment Systems (372)

Consumer Protection Law (373)\*



Creditors' Rights and Debtors' Protection (378)  
 Commercial Law Seminar (379)\*  
 International Business Transactions (446)  
 International Banking (575)

***Constitutional Law, Civil Rights, and Government***

Federal Jurisdiction (300)  
 Administrative Law (342)  
 Public Law Seminar (344)  
 Constitutional Law Seminar (350)\*  
 Law of Presidential Power (351)\*  
 Mass Communications Law—Print Media (352)  
 Mass Communications Law—Electronic Media (353)  
 Individual Rights and Liberties (358)\*  
 Civil Rights Legislation (359)  
 Legislation (362)  
 Government Lawyering (400)\*  
 Introduction to Quantitative Analysis for Lawyers (401)\*  
 Housing Rights Seminar (405)\*  
 Local Government (409)\*  
 Employment Discrimination Law (431)  
 Federal Indian Law Seminar (433)\*  
 Foreign Relations, National Security, and the Constitution (443)  
 Law of Privacy Seminar (469)  
 Law, Science, and Technology Seminar (475)  
 Disabled People and the Law (482)  
 Gender Discrimination and the Law (484)  
 Legislative Drafting (591)

***Corporate and Securities Law***

Agency and Partnership (322)  
 Law and Accounting (324)\*  
 Corporations (325)  
 Securities Regulation (326)  
 Takeovers and Tender Offers (327)  
 Regulation of Securities Markets and Professionals (328)  
 Corporate Finance (329)  
 Business Planning (334)  
 The Modern Corporation Seminar (336)\*  
 Advanced Corporations and Securities Seminar (337)\*  
 Insurance (382)  
 Regulation of Investment Advisers and Investment Companies (507)\*

***Criminal Law and Procedure***

Law and Psychiatry Seminar (437)  
 Federal Sentencing Seminar (477)  
 Law and Criminology (478)  
 Law of Criminal Corrections (479)\*  
 White Collar Crime Seminar (480)  
 The Crime Lab, the Forensic Scientist, and the Criminal Lawyer (532)  
 Environmental Crimes (535)  
 Environmental Crimes Project (536)

***Environmental Law***

Environmental Law (410)  
 Clinical Studies in Environmental Law (414)  
 Occupational Safety and Health Legislation (415)\*  
 Toxic Tort Litigation (455)  
 Law, Science, and Technology Seminar (475)  
 Environmental Crimes (535)  
 Environmental Crimes Project (536)  
 Water Pollution Control (539)  
 Air Pollution Control (540)  
 Environmental Remedies (541)  
 Environmental Issues in Business Transactions (542)  
 Water Resources Law I (543)  
 Environmental Planning (544)  
 Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (545)  
 Natural Resources Law I (546)  
 Natural Resources Law II (547)  
 Control of Solid and Hazardous Wastes (RCRA & CERCLA) (548)  
 Energy Law (549)  
 Use and Control of Nuclear Energy (550)  
 International and Comparative Environmental Law (551)  
 Natural Resource Taxation (580)\*

***Estate Planning***

Trusts and Estates I (390)  
 Trusts and Estates II (391)  
 Community Property/Marital Property (394)  
 Estate Planning Seminar (395)\*  
 Federal Estate and Gift Taxation (422)  
 Federal Income Taxation of Trusts, Estates, and Beneficiaries (585)\*

***Family Law***

Trusts and Estates I (390)  
 Community Property/Marital Property (394)

Family Law (434)  
 The Child, the Family, and the State (436)  
 Gender Discrimination and the Law (484)

#### ***Government Procurement Law***

Labor Standards (429)\*  
 Comparative Public Procurement (485)\*  
 Government Contracts (486)  
 Government Procurement Law (487)  
 Performance of Government Contracts (488)  
 Government Contracts Seminar (490)  
 Government Contracts Cost & Pricing (491)  
 Clinical Studies in Government Contracts Law (597)

#### ***Government Regulation***

Administrative Law (342)  
 Regulated Industries (345)\*  
 Mass Communications Law—  
   Electronic Media (353)  
 Unfair Trade Practices (450)  
 Federal Antitrust Law (452)  
 Public Economic Policy and the Law (501)  
 International and U.S. Regulation of Foreign Trade (505)  
 Health Care Delivery Systems Seminar (508)  
 Food and Drug Law (509)  
 Telecommunications Law (572)

#### ***Intellectual Property Law***

Unfair Trade Practices (450)  
 Patent Law (464)  
 Patent Policy and Practice (466)  
 Computer Law (468)\*  
 Licensing of Intellectual Property Rights (552)\*  
 Chemical and Biotech Patent Policy and Practice (553)\*  
 Comparative Patent Law Seminar (554)  
 Patent Enforcement (556)  
 Electronics and Computers: Policy and Practice (557)\*  
 International and Comparative Patent Law (558)  
 Copyright Law (559)  
 Trademark Law (560)  
 Comparative and International Intellectual Property Seminar (595)\*

#### ***International and Comparative Law***

Immigration Law (360)  
 Refugee and Asylum Law (361)  
 International Commercial Law (371)  
 Admiralty (386)  
 Comparative Law (438)  
 Foreign Relations, National Security, and the Constitution (443)  
 International Law (444)  
 International Business Transactions (446)  
 International Organizations (447)  
 International Arbitration (448)\*  
 International Civil Litigation (449)  
 Public International Law Seminar (504)\*  
 International and U.S. Regulation of Foreign Trade (505)  
 International Business Transactions Seminar (506)\*  
 International and Comparative Environmental Law (551)  
 International and Comparative Patent Law (558)  
 Law of the European Communities (561)  
 Law of Japan (562)\*  
 International Law of Human Rights (565)  
 International Law of Air and Space (566)  
 International Law of the Sea (567)  
 International Humanitarian Law (568)  
 International Negotiations (571)\*  
 International Banking (575)  
 Foreign Direct Investment (576)  
 Federal Income Taxation of International Transactions (583)\*

#### ***Jurisprudence, Legal History, and Professional Responsibility***

American Legal History (318)  
 Jurisprudence (442)  
 Professional Responsibility and Ethics Seminar (456)\*  
 Jurisprudence Seminar (457)\*  
 Feminist Legal Theory (458)  
 Law, Science, and Technology Seminar (475)

#### ***Labor Law***

Labor Law (338)  
 Individual Employment Rights (339)  
 Collective Bargaining and Labor Arbitration (340)\*



Labor and Employment Law Seminar (341)\*  
Sports Law (383)  
Occupational Safety and Health Legislation (415)\*  
Labor Standards (429)\*  
Employment Discrimination Law (431)  
Employee Benefit Plans and the Labor/Management Relationship (435)

#### *Land Use and Development*

Modern Real Estate Transactions (398)  
Planning, Zoning, and Land Use Law (402)  
Land Use Administrative Process (404)\*  
Land Development Law (408)  
Local Government Law (409)\*  
Law of Real Estate Financing (538)

#### *Law and Other Disciplines*

Introduction to Quantitative Analysis for Lawyers (401)\*  
Law and Psychiatry Seminar (437)  
Medicine for Lawyers (470)\*  
Law and Medicine (472)  
Law and Psychology (473)  
Drugs and the Law Seminar (474)  
Law, Science, and Technology Seminar (475)  
Law and Criminology (478)  
Public Economic Policy and the Law (501)  
Law and Economics (502)  
Health Care Delivery Systems Seminar (508)

#### *Litigation and The Judicial Process*

Federal Trial Practice (302)  
Appellate Practice and Procedure (304)  
Complex Litigation (308)\*  
Student Trial Lawyers Association Trial Competition (309)  
Civil Procedure Seminar (310)  
Trial Advocacy (311)  
Moot Court (312)  
Advanced Oral Advocacy (313)  
Equity (374)  
Remedies (380)

Admiralty (386)  
Government Lawyering (400)\*  
Conflict of Laws (440)  
International Civil Litigation (449)

#### *Taxation*

Federal Income Taxation (420)  
Federal Estate and Gift Taxation (422)  
Federal Income Taxation of Corporations and Shareholders (424)  
Partnership and Subchapter S Corporation Taxation (426)  
Tax Policy Seminar (428)  
Taxation—Timing of Income and Deductions (573)\*  
Special Corporate Taxation Problems (577)\*  
Nonprofit Organizations: Law and Taxation (578)  
Real Estate and Income Taxation (579)\*  
Natural Resource Taxation (580)\*  
State and Local Taxation (581)\*  
Federal Income Taxation of International Transactions (583)\*  
Federal Income Taxation of Property Transactions (584)\*  
Federal Income Taxation of Trusts, Estates, and Beneficiaries (585)\*  
Tax Practice and Procedure Seminar (588)\*

#### *Tort Law*

Complex Litigation (308)\*  
Trial Advocacy (311)  
Remedies (380)  
Insurance (382)  
Conflict of Laws (440)  
Products Liability (454)  
Toxic Tort Litigation (455)  
Medicine for Lawyers (470)\*  
Law and Medicine (472)

#### *Research and Writing*

Independent Legal Writing (314)  
Law Review (364)  
Journal of International Law and Economics (366)  
Research and Writing Fellow (368)  
Graduate Independent Legal Writing (598)  
Thesis (599–600)

## Course Descriptions

The courses of instruction are described below. The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, an academic-year course with two hours of credit each semester is marked (2-2) and a semester course with two hours of credit is marked (2). Some courses are offered for variable credit hours and are marked (2 or 3) or (3 or 4). Each semester's class schedule will indicate the number of hours for which the course is being offered.

In most courses, a final examination is held during the examination period and the grade in the course is determined in large part by that examination. These courses are marked "Examination."

Courses that require the preparation of a major research paper in lieu of an examination are marked "Research Paper." The satisfactory completion of such a paper by a student individually will satisfy the Legal Writing curriculum requirement for the J.D. degree.

Courses marked "Problem Assignments," "Writing Assignments," "Take-home Examination," or "Research Paper or Examination," indicate the nature of the method planned by the instructor for determining in major part the grade to be given for the course. Only research papers qualify for the Legal Writing curriculum requirement for the J.D. degree.

Day classes begin at 9:10 a.m. and run throughout the entire morning and afternoon. Most evening classes begin at 5:50 p.m. Many examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be held in the evening.

A designation at the end of a course description indicates whether the course is scheduled to be offered in the spring or fall semester or in the summer session and also usually whether it will meet in the day or evening. When a double-numbered course is designated "Academic year," the first half of the course is scheduled to be offered in the fall, the second half in the spring.

## Required Courses for J.D. Students

Note: Law 214 *Constitutional Law II*, 217 *Criminal Procedure*, and 232 *Evidence* are required only for students graduating in May 1994 or earlier.

### 203-4 Contracts I-II (3-3 day)

Pock, Hamburger, Maggs, Cahn

(4-2 evening)

Legal remedies of contracting parties, including damages in contract and quasi-contract, specific performance, reformation, rescission, remedies in tort, acts creating and terminating contractual rights, including offer and acceptance, mistake, problems of proof, function of consideration, conditions, assignments, third-party beneficiaries, effect of changed circumstances, protection of the client's interests upon breach or threat of breach by the other party. Emphasis on problems of analysis, draftsmanship, adversary method. (Examination)

(Academic year—day and evening)

### 207 Torts (4)

Seidelson, Schechter, Turley, Sharpe, Banzhaf

Liability for harm to person or property. Intentional torts, negligence, nuisance, products liability, defamation, and invasion of privacy; fault and other bases for shifting losses, causation, damages, effects of liability insurance, problems under Federal Tort Claims Act. (Examination) (Fall—day and evening)

### 211 Property (4)

J. Schwartz, Johnston, Brauneis

Basic concepts of personal property. Real property: historical background of the law of estates and conveyancing, types of estates, dower and curtesy; landlord and tenant relationship, concurrent estates, future interest at common law and after the Statute of Uses, introduction to modern conveyancing—the real estate contract, the deed, the recording system, methods of title assurance (Examination) (Fall—evening, spring—day)



- 213 Constitutional Law I (Federal Systems) (3)** Barron, Park, Dienes, Bruff  
Basic principles of American constitutional law, with a focus on governmental powers and the role of the Supreme Court in interpreting and enforcing constitutional norms. The nature and scope of judicial review. The case and controversy requirement and other limitations on constitutional adjudication. Powers of the president and Congress, the separation of powers doctrine. Relationship of the national government to state governments and principles of federalism. The state action doctrine. (Examination) (Spring—day and evening)
- 214 Constitutional Law II (3)** Barron, Lupu, Dienes, Kahlenberg  
Individual rights and liberties in the American constitutional scheme and the different judicial methods of reconciling majoritarian governance with individual freedom. Privileges and immunities of national citizenship, due process of law, equal protection guarantees, freedom of expression and of religion, rights of privacy and association. (Examination) (Fall—day and evening)
- 216 Criminal Law (3)** Robinson, Butler, Wasserstrom, Collins  
An overview of the criminal justice system, dimensions of the problem of crime and goals of penal sanctions. An examination of what conduct should be made criminal and what sanctions should be applied. The theoretical anatomy of a criminal offense (elements of *mens rea* and *actus reus*), the general principles of criminal liability, and the various defenses. Special problems, such as conspiracy, inchoate crimes, causation, insanity, and complicity, are subjected to detailed analysis. (Examination) (Fall—day; spring—evening)
- 217 Criminal Procedure (3)** Cheh, Saltzburg, Starrs, Butler  
Comprehensive presentation of major issues in criminal process, with heavy reliance on Supreme Court cases interpreting the Constitution. The course proceeds through the criminal justice system, from first police contact, search interrogation, and other investigation, through the prosecution, preliminary proceedings, and trial. Problems of federalism, the exclusionary rule, and sentencing. (Examination) (Fall—day and evening; spring—day)
- 218-19 Civil Procedure I-II (3-3)** Friedenthal, Raven-Hansen, Trangsrud, Peterson, Carter, Schaffner, Clark  
The theory and practice of civil litigation. Analysis of the goals, values, costs, and tensions of an evolving adversarial system of adjudication. Examination of the rules and statutes that govern the process by which substantive rights and duties are enforced in our federal and state courts. Topics include the relationship of procedure to substantive law, the proper reach of judicial authority, pleading, motions practice, joinder of parties and claims, class actions, pretrial discovery, trial by jury, remedies, post-trial procedure, appeals, claim and issue preclusion, and alternative dispute resolution. (Examination) (Academic year—day and evening)
- 220 Legal Research and Writing (2)** Schultz and Staff  
Introduction to use of a law library, research experience in primary, secondary, and specialized sources of law, practice in proper legal citation form. Instruction and practice in legal writing and analysis, with primary emphasis on legal memoranda. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Failure to complete the work in this course will result in a grade of *F*. (Fall—day and evening)
- 221 Introduction to Advocacy (2)** Schultz and Staff  
Instruction and experience in the research and writing of pretrial motions and appellate briefs, with emphasis on preparing and presenting arguments persuasively. Also instruction and practice in preparing and presenting oral arguments. This course must be completed successfully in order to earn credit for Law 220. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. Failure to complete the work for this course will result in a grade of *F*. (Spring—day and evening)
- 222 Professional Responsibility and Ethics (2 or 3)** Jenkins, Peroni, Gabaldon Morgan, Johnston  
Ethical problems involved in civil and criminal counseling and litigation. Rules of Professional Conduct and legal discipline, roles of bar associations and courts in regulating lawyer conduct. (Examination) (Fall—day and evening, spring—day and evening)

**232 Evidence (4)**

Robinson, Saltzburg, Alvarez, Carter

Consideration of the policies, principles, standards, and rules governing the trial of civil and criminal cases in federal and state courts. Topics may include relevancy, the hearsay rule, direct and cross examination of witnesses, opinion, scientific evidence, impeachment, privileges, writings, real and demonstrative evidence, judicial notice, confrontation and compulsory process, and burdens of proof and presumptions (Examination) (Spring—day and evening, fall—day)

**Elective Courses**

**Note:** Students graduating after May 1994 may also choose to take as electives Law 214 *Constitutional Law II*, 217 *Criminal Procedure*, and 232 *Evidence*, which are listed under the heading Required Courses for J.D. Students.

**300 Federal Jurisdiction (3)**

Barron, Peterson

Analysis of the relationship of the federal courts to Congress and to the states. Topics may include judicial review, standing and justiciability, congressional power to regulate jurisdiction, legislative courts, federal question, diversity, removal, civil rights, and habeas corpus jurisdiction, state sovereign immunity, Supreme Court appellate jurisdiction, abstention, federalism doctrines, and federal common law. (Examination) (Spring—day and evening)

**302 Federal Trial Practice (2)**

Jackson

Presentation of cases focusing on the critical procedural stages of litigation in federal court. Pretrial motions and discovery, including depositions of lay and expert witnesses, witness examination, introduction of evidence, courtroom techniques, and oral argument, are covered using pleadings from actual cases tried in federal court. Prerequisite Law 218, prerequisite or concurrent registration. Law 232 The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—evenings)

**303 Mediation (2)**

Izumi, Irvine

Consideration of the growing use of mediation to resolve disputes and comparison with other dispute resolution processes. Taking the roles of mediators and disputants, students participate in a number of simulations, both in and outside of class. Mock mediations are conducted individually and with a co-mediator. Examination of practical and ethical issues, applicability to various substantive areas including contract, tort, consumer, family, criminal, discrimination, and landlord/tenant. Students are expected to fill out role-playing evaluations of themselves and classmates on a regular basis and to write a 15-page paper discussing a particular application of mediation or an ethical or legal question involving mediation. Class attendance is mandatory. Enrollment is limited. (Fall—day and evening)

**304 Appellate Practice and Procedure (2)**

Michel

Study of the philosophy and mechanics of the appellate process through assigned readings, lecture, brief student oral presentations, and class discussion. The course will focus on the interplay or tension between procedural and substantive law, fact and law, merit and advocacy, deference and fairness, and the effect of these factors on the disposition of individual appeals and the clarification of law by appellate courts. (Research paper) (Spring—day)

**305 Negotiations (2)**

Craver, Irvine

Examination of the negotiation process employed by legal practitioners. The assigned text considers the negotiation process, negotiating techniques, verbal and nonverbal communication, and other factors that influence these interpersonal transactions. Students engage in negotiation exercises that enable them to practice the art of negotiating and to examine their personal strengths and weaknesses. Grades are determined in meaningful part by the results obtained, vis-a-vis other class members, from these exercises. Students are also required to prepare a short paper on a topic pertaining to the negotiation process. (Fall—day; spring—evenings)

**306 Client Interviewing and Counseling (2)**

Schultz

Practice with gathering and evaluating facts supplied by clients, followed by presentations of advice based on consideration of facts and applicable law. Discussion of interpersonal aspects of client relations and ethical problems that may arise in the context of client interviews. Students will participate in simu-



lated interviews, portraying both clients and attorneys. Students will also be required to write a paper discussing some aspect of the interviewing and counseling process. Enrollment limited to 20. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. (Simulation and paper) (Spring—day)

**308 Complex Litigation (3)**

Trangsrud

Analysis and critique of complex civil litigation in the state and federal courts. Examination of complex joinder, the management of factually related claims in multiple venues, modern class-action practice, and current developments in the law of claim and issue preclusion. Other topics covered in some years include judicial supervision of plaintiff and defendant class actions; discovery and judicial control of large cases; the role of juries, magistrates, and masters in complex cases, and problems attending complex remedies such as the use of structural injunctions to reform public schools, hospitals, and prisons. (Examination)

**309 Student Trial Lawyers Association Trial Competition (1 or 2)**

The Student Trial Lawyers Association sponsors an intrascholastic competition in the fall semester. The competition offers students an opportunity to practice trial skills and serves as a basis for selection of teams to represent the National Law Center at various interscholastic trial competitions. The competition requires a two-person team to prepare a written trial brief and argue its case before a judge and jury. The competition also provides a seminar on trial advocacy skills, strategies, and techniques. Students who participate in the fall competition receive one academic credit. Those students attending interscholastic trial competitions in the spring semester receive two additional credits. Under no circumstances may a student receive more than a total of 3 hours of credit for intra- and interscholastic competitions under Law 309 and/or Law 312. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)

**310 Civil Procedure Seminar (2)**

A. Robinson

Study of specific problems in civil procedure. Topics will vary. The topic will be announced each year prior to registration. (Research paper) (Spring—day)

**311 Trial Advocacy (3)**

Saltzburg, Levie, Gilligan, Mayer, Rader

Pretrial and trial techniques with emphasis on procedural, evidentiary, tactical, and ethical problems experienced by trial lawyers in actual cases. Complaint drafting, pretrial motions, depositions and other discovery methods, preparation of witnesses, jury selection, the use of experts, direct and cross-examination, introduction of documents, courtroom techniques, and opening and closing arguments. Role playing in simulated courtroom situations. Once registered, no student may drop this course without the express permission of the dean. Prerequisite: Law 232. The grade *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. For students who entered the law school in fall 1990 or later, this course will count toward the 17 hours that students may take on a Credit/No Credit basis (Short papers and exercises) (Fall—day and evening; spring—evening; summer)

**312 Moot Court (1 or 2)**

Satisfactory participation in the preliminary rounds of the Van Vleck Moot Court competition results in 1 hour of credit; satisfactory participation in at least one additional elimination round results in 2 hours of credit. Satisfactory participation in the Jessup Cup or Giles S. Rich competition results in 1 hour of credit; finalists receive 2 hours of credit. Satisfactory participation in a trial-level, in-house competition results in 1 hour of credit. Participants in interscholastic appellate or trial-level competitions receive 2 hours of credit, however, participants in the Van Vleck Moot Court competition who received 2 hours of credit, or finalists in the Jessup Cup or Giles S. Rich competition, receive only 1 hour of credit for participation in an interscholastic competition. In no event may a student receive more than a total of 3 hours of credit for intra- and interscholastic competitions under Law 312 and/or Law 309. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)

**313 Advanced Oral Advocacy (2)**

Schultz

Focus on persuasive use of language and oral communication skills in litigation and nonlitigation contexts. Study of historical and modern rhetoric, effective use of language, legal and other authority, facts, and speaking techniques. Students will research, write, perform, and receive feedback on oral presentations in

- appellate, trial, legislative, and expository settings. Enrollment limited to 20. (Writing assignments and oral presentations) (Fall—day)
- 314 Independent Legal Writing (1 or 2)** Staff  
Preparation of a research paper under the supervision of a full-time member of the faculty who will determine, prior to registration, whether the work required for the topic selected justifies 1 or 2 credit hours of credit. If elected for 1 hour of credit, this course may be repeated to meet the legal writing requirement for the degree. Approval of the faculty member is required prior to registration. See recommended guidelines under Academic Regulations, Research Papers (Research paper) (Fall, spring, summer—as arranged)
- 318 American Legal History (2 or 3)** Hamburger  
Philosophical and historical roots of the American Constitution, with consideration of the writings of Locke, Hobbes, and Montesquieu, the natural law and social contract theories, and the application of these concepts in the debates surrounding the drafting and ratification of the Constitution. The degree to which these concepts have been reflected in decisions of the Supreme Court, with primary focus on the Marshall Court but consideration also of more recent decisions. (Examination or research paper) (Fall—evening)
- 322 Agency and Partnerships (2)** Schiller  
Employment relations, vicarious liability of employers for employees' torts, scope of employment, and independent contractors, agents' authority and apparent authority to contract for their principals, ratification, nonprofit associations; the formation, operation, and termination of partnerships, limited partnerships. (Examination) (Fall—day and evening)
- 324 Law and Accounting (2)**  
Study of fundamental accounting principles with emphasis on corporation accounting, legal and accounting implications of specific items in financial statements of corporations, inventory adjustments, corporate transactions, distributions, capital adjustments. Strongly recommended for students who have had no accounting. (Examination and problem assignments)
- 325 Corporations (4)** Solomon, Galston, Mitchell, Siegel  
Corporate law, with emphasis on operations and financing of corporations. Control of corporations, action by corporate directors, officers, shareholders. Control devices. Directors' and shareholders' duties of care and loyalty, insiders' transactions in shares of the corporation. Derivative suits, kinds of shares, dividends, corporate distributions. (Examination) (Fall—day, spring—evening)
- 326 Securities Regulation (3)** Painter, Gabaldon  
The basic course in the study of federal and state laws governing the offering, distribution, and trading of securities. Focus on federal laws and regulations, in particular the Securities Act of 1933, the Securities Exchange Act of 1934, and the enforcement of these laws by the SEC and private parties. Prerequisite: Law 325. (Examination) (Spring—day and evening)
- 327 Takeovers and Tender Offers (2)** Painter  
Federal and state regulation of corporate takeover bids and tender offers, including theories of corporate acquisitions, the Williams Act, and regulation of takeover tactics and defenses. Prerequisite: Law 325. (Research paper) (Spring—day)
- 328 Regulation of Securities Markets and Professionals (2)** Painter  
Federal regulation of securities markets and professionals, including regulation of exchanges, broker-dealers and investment advisers, internationalization of markets, and SEC administrative proceedings against broker-dealers and others. Prerequisite: Law 325. (Take-home examination) (Fall—day)
- 329 Corporate Finance (2 or 3)** Mitchell  
General introduction to finance theory, problems in the issuance and reacquisition of corporate securities, analysis of various types of securities, problems involved in the use of debt and payment of corporate dividends, and financial analysis of mergers, acquisitions, recapitalizations, dissolutions, and liquidations. Prerequisite: Law 325. (Examination)
- 332 Banking Law I (3)** Buchman, Sczudlo  
Federal regulation of the financial services industry, especially commercial banks. Includes an analysis of the Federal Deposit Insurance Corporation as



insurer of deposits, receiver, and liquidator of troubled banks; the role of the Comptroller of the Currency as the primary federal regulator of national banks, including the chartering function, bank examinations, analysis of classified loans, capital adequacy, and enforcement of substantive federal legislation, operation of the Federal Reserve System under the Bank Holding Company Act and the various substantive regulations such as Reg. B (equal credit opportunity), Reg. J (check collection), Reg. M (consumer leasing), Reg. Q (deposit rate regulation), Reg. O (insider loan limits), Reg. E (electronic funds transfer), and Reg. Z (truth in lending), geographic deregulation and the trend toward interstate banking, and an analysis of financial services product deregulation and unification of the industry along functional lines. (Examination) (Spring—evening)

**333 Banking Law II (2)**

Bank holding companies; activities closely related to banking under FRB Regulation Y; outer limits of the business of banking; banks, bank holding companies, and the securities laws, savings and loan holding companies, Change in Bank Control Act, the FDIC and the troubled bank, bank liquidation and purchase and assumption arrangements, federal deposit insurance, the FDIC as receiver of a failed bank, international banking, including foreign banks in the United States, U.S. banks abroad, and foreign bank regulation of American banks abroad. (Examination)

**334 Business Planning (2)**

Flyer, Press, Cooney, Cirulnick

Integrated study of corporate, financial, tax, accounting, and SEC aspects of the following: organization of a small corporation; organization of a public corporation; stock dividends, recapitalization, and stock purchases in the context of conflict between active stockholders of a closed corporation and the family of a deceased active stockholder; corporate liquidations; corporate mergers and acquisitions, and divisions of corporations. Prerequisite: Law 325 and 420. Cooney, Press—prerequisite: Law 424; Flyer, Cirulnick—prerequisite or concurrent registration: Law 424. Enrollment may be limited by the instructor. (Problem assignments) (Fall—evening; spring—evening)

**336 The Modern Corporation Seminar (2)**

Solomon

Analysis of the nature and role of the business corporation in the American and transnational political economy, evolution of the corporation and the political economy, impact of technological change on the corporation and the political economy, reasons for and consequences of the growth of large corporate enterprises, role of entrepreneurs in the political economy; relationship of corporations to the government and other centers of power. (Research paper)

**337 Advanced Corporations and Securities Seminar (2)**

Current issues in corporate and securities law practice and theory. Prerequisite: Law 325. (Research paper)

**338 Labor Law (3)**

Craver, Freilicher

Law governing labor-management relations, organizations and representation of employees, regulation of economic weapons, enforcement of collective bargaining agreements, interunion and intra-union relations. (Examination) (Fall—day; spring—evening)

**339 Individual Employment Rights (2 or 3)**

Cacozza

Individual rights and obligations in employment; exploration of common law and statutory regulation of the individual employment relationship from its inception to its termination, emphasis on current developments such as wrongful discharge, medical screening, drug testing, employer-provided health insurance and child care, occupational safety and health, workers' compensation, and retirement issues. (Examination) (Spring—evening)

**340 Collective Bargaining and Labor Arbitration (2 or 3)**

Negotiation, content, and administration of collective bargaining agreement through the grievance procedure and arbitration, problems in negotiation and administration of collective labor agreements. Prerequisite: Law 338 or permission of instructor. (Negotiation and arbitration exercises)

**341 Labor and Employment Law Seminar (2)**

Group study of contemporary problems relating to labor and employment law. Enrollment limited. (Research paper)

- 342 Administrative Law (3)** Park, J. Schwartz, Banzhaf, T. Schwartz  
Study of the administrative processes of government in executive and independent agencies. The federal Administrative Procedure Act is emphasized, with particular attention to adjudication, rulemaking, judicial review, investigatory powers, and enforcement. Study may include comparative state administrative law. Constitutional topics include separation of powers and due process. (Examination) (Fall—day; spring—day and evening)
- 344 Public Law Seminar (2 or 3)** Park, Turley, Mushal  
Group study of specific problems of public law; selection will vary with the professor and from year to year. See special posting for the current semester. (Fall—evening; spring—day)
- 345 Regulated Industries (2)** Morgan  
Substantive problems of business regulation in terms of natural monopolies, licensed industries, health, safety, and rate regulation. Typical problems raised include the impact of regulation upon management and market behavior, the uses of economic evidence, and the effects of judicial and legislative review. Each student selects one industry and develops an insight into economic regulation in terms of that industry's market structure, growth, trade associations, and regulatory agencies. (Research paper)
- 350 Constitutional Law Seminar (2)** Lupu  
Group study of contemporary problems in constitutional law, process of constitutional litigation, problems of effectuating constitutional guarantees. Limited enrollment. (Research paper or examination)
- 351 Law of Presidential Power (3)** Bruff  
An examination of the law that governs the presidency. Because many limitations on presidential power are drawn from constitutional allocations of power to Congress and the federal courts, separation of powers issues permeate the subject. Topics include executive orders and the limits of presidential "lawmaking," legislative vetoes, executive privilege, policy coordination through supervision of the bureaucracy, impoundment, limits on presidential discretion to enforce the laws (e.g., special prosecutors), the president's role in foreign affairs (executive agreements, claims settlements, treaty powers), the president's powers as Commander-in-Chief, and transferring presidential power (impeachment, disability). The course will stress the role of the lawyer as executive advisor, a role performed by many government attorneys, not solely those who advise the president. (Examination)
- 352 Mass Communications Law—Print Media (2)** Dienes  
Study of the text, historical origin, and theoretical foundation of the Press Clause and of the role played by the mass media in modern society. Examination of the common law and constitutional protection accorded mass media publishing in areas such as libel law, the law of privacy, and liability for physical, emotional, or economic harm. The legal status of newsgathering, including problems of journalist's privilege and access to information possessed by government. Possible other topics: a right of access to the media, the student press, the press in other countries, restraints on press solicitation, advertising and promotion, and the press and national security (Barron—examination or research paper); (Dienes—examination) (Fall—evening)
- 353 Mass Communication Law—Electronic Media (2)** Barron  
Study of the origins and development of electronic media and an examination of the continuing debate over regulation and deregulation of broadcasting. The allocation of the broadcasting spectrum, licensing and licensing renewals, and regulation of programming content. Problems posed by concentration of media ownership and the efforts to promote minority participation in ownership and management of broadcasting. The relation of government to public (noncommercial) broadcasting. The development of cable television and problems in regulation and deregulation, including issues of jurisdiction, franchising, syndication or programming, regulation of content control, and mandatory public access. The emergence of new communications technologies and the legal problems they pose (Barron—examination or research paper); (Dienes—examination) (Fall—day)



- 358 Individual Rights and Liberties (3)**  
Principles of equality and due process in the Fifth and Fourteenth Amendments. The power of Congress to enforce the Fourteenth Amendment. Focus on individual rights and liberties under the U.S. Constitution. First Amendment rights, particularly religion and speech clauses. The right of association. Other personal rights in the Bill of Rights. Methodology of judges in deciding cases involving individual rights and liberties, particularly the "balancing test" and the judges' views of societal interests.
- 359 Civil Rights Legislation (3)** Dienes  
Examination of federal legislation protecting individual rights and liberties as well as the administrative and judicial implementation of that legislation. Remedial provisions for the enforcement of federal constitutional and statutory rights (e.g., 42 U.S.C. §§1983, 1985) and federal statutes prohibiting discrimination in housing, contractual relations, voting, education, and federally funded programs. Prerequisites: Law 213 and Law 214. Law 217 recommended. (Examination) (Spring—day)
- 360 Immigration Law (2)** Grussendorf  
Law and practice under the McCarran-Walter Act, involving questions of immigration, emigration, expatriation, nationality, and naturalization. Consular, Immigration and Naturalization Service, and Labor Department practice. (Examination) (Fall—evening)
- 361 Refugee and Asylum Law Seminar (2)** Grussendorf  
Selected topics from the areas of international law pertaining to the protection of refugees and domestic law of political asylum. (Research paper) (Spring—day)
- 362 Legislation (2 or 3)** Block, Cacozza  
Legislative process and the construction and legal effect of statutes. Topics that may be considered include representational structures, lobbying, judicial review, direct democracy, legislative fact-finding and drafting, and the preparation and significance of legislative history. This course is a prerequisite to several advanced public law courses. (Examination) (Fall—evening; spring—day)
- 364 Law Review (1, 2, 3, or 4)** Staff  
Limited to members of the student staff of the *Law Review*. A maximum of 4 credit hours of credit may be earned in this course. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—as arranged)
- 366 Journal of International Law and Economics (1, 2, 3, or 4)** Staff  
Limited to members of the student staff of the *Journal of International Law and Economics*. A maximum of 4 credit hours of credit may be earned in this course. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—as arranged)
- 368 Research and Writing Fellow (2)** Schultz  
Limited to students selected to assist in teaching first-year Legal Research and Writing (Law 220) and Introduction to Advocacy (Law 221). Two credit hours may be earned in both the fall and spring semesters. The grade of CR (Credit) or NC (No Credit) is given for this course. (Fall and spring—day and evening)
- 370 Sales and Sales Financing (2 or 3)** Zubrow  
Provisions of the Uniform Commercial Code relating to sale and distribution of goods, including bulk transfers, warehouse receipts, bills of lading, and other documents of title; particular attention to secured transactions and financing devices utilized in this connection. (Examination) (Spring—day and evening)
- 371 International Commercial Law (2)** Spanogle  
The study of international transactions for the purchase, sale, payment for, and financing of goods, as governed by the U.N. Convention on Contracts for the International Sale of Goods and other multilateral treaties on international lease financing, factoring, commercial paper, and fund transfers. The substantive provisions of these treaties, the process by which they are developed, and the various interpretive approaches available under different legal regimes will be considered. Prerequisite: Law 446 or permission of the instructor. (Examination or research paper) (Spring—day)
- 372 Commercial Paper—Payment Systems (2 or 3)** Spanogle, Maggs  
Classic view of negotiable instruments as codified by Article III of the Uniform Commercial Code. Check collection: the system in theory as expressed in Article IV of the Uniform Commercial Code and the system in practice; Federal Reserve

regulations, Clearing House agreements, and automation systems. The dual banking system, work of the Comptroller General and the Federal Reserve Board. Legal problems concerning interest and the checkless society. (Examination) (Fall—day and evening)

- 373 Consumer Protection Law (3)** Spanogle  
A study of the methods used to protect consumers in transactions, and particularly in credit and credit sales transactions, including regulation on both voluntary and involuntary disclosure of information through common law and statutory devices, regulation of seller and creditor conduct before, during, and after a transaction, and control of prices of goods, services, and loans. Both state and federal regulations will be examined. The course will compare regulatory techniques available through caselaw, general statutory provisions, and specific, targeted technical statutes. Public and private enforcement mechanisms will also be compared. (Examination or research paper.)
- 374 Equity (2)** Pock  
Evolution of equity jurisprudence and its administration of a remedial scheme separate and distinct from that administered by common law jurisprudence. Constitutional and systemic limitations upon equity. Effect of merger of common law and equity courts on the federal and state level. Temporary and permanent injunctive relief, specific performance, cancellation, restitution, reformation, constructive trusts, equitable liens, marshaling, equitable writs, and equitable defenses, such as *laches*, *estoppel in pais*, and "unclean hands." Relative efficacy and availability of equitable and legal remedies. (Examination) (Summer)
- 378 Creditors' Rights and Debtors' Protection (3 or 4)** Zubrow, Galston  
Creditors' remedies and debtors' protections under state law: writs of attachment, garnishment and execution, acquisition of liens and forced sales of property, self-help arrangements, and security agreements. Bankruptcy under federal law: who may file, the creation and administration of the bankruptcy estate, powers of the trustee, discharge of debt, rehabilitation plans for individuals under Chapter 13. (Examination) (Fall—day; spring—evening)
- 379 Commercial Law Seminar (2)** Spanogle  
Group study of contemporary problems in the theory and practice of commercial law. Limited enrollment. Research paper
- 380 Remedies (3)** Sharpe  
Obtaining judgments for money and specific relief in civil actions for past and threatened harms to property and persons: stating legal and equitable theories of claim, defining harms and appraising damages, applying remedial concepts such as quasi contract, tracing, constructive trust, rescission, and injunction, maximizing relief and assuring payment or performance. (Examination) (Fall—day; spring—evening)
- 382 Insurance (2)** Schiller, Pock  
A primary risk-distributing medium and the rules by which legislative, administrative, and judicial bodies seek to promote its benefits and avert its dangers. Insurance marketing, insurable interest, subrogation, transfer of insurance benefits to nonpolicyholders, coverage and other insurance policy provisions, disposition of claims. (Examination) (Fall—day; summer)
- 383 Sports Law (2)** Babby, Levinstein  
Selected issues involving professional sports including contract, arbitration, labor, and antitrust law. Significant contemporary developments. (Examination) (Fall—evening)
- 386 Admiralty (3)** Sharpe  
The maritime law applied in federal and state courts, admiralty jurisdiction and practice, litigation and arbitration, making uniform law by international convention. The U.S. law of seamen, shoreside workers, and personal injury and death in navigable waters, maritime liens and ship mortgages, carriage of goods by water; collisions at sea; salvage, general average, and limiting liability for private damage and environmental harms. (Examination) (Spring—day)
- 390 Trusts and Estates I (3 or 4)** Johnston, Edmisten, Valdez  
Noncommercial transfers of wealth at death or during life, essential elements and formalities for creation of trusts and execution of wills, revocation and alteration, grounds for contest, limits on property owner's power to control, intestate



- succession. Prerequisite: Law 211. (Examination and problem assignments) (Fall—day and evening; spring—day)
- 391 **Trusts and Estates II (2)** Bradford  
Dispositive provisions with regard to property transfers, wills, and trusts, common questions of construction, future interest problems, administration of estates and trusts, charitable trusts. Prerequisite: Law 390 (Drafting assignments and examination) (Spring—day)
- 394 **Community Property/Marital Property (2)** Ridder  
Legal rules and planning considerations with respect to property owned and acquired by married persons. Primary emphasis will be on the law of the eight community property states, but special attention will also be given to the parallel problems seen under the now widely enacted statutes creating judicial power to decree an equitable distribution of a divorcing couple's marital property. As time permits, federal tax rules and considerations will also be discussed. (Research paper or examination) (Spring—day)
- 395 **Estate Planning Seminar (2 or 3)**  
Study of the effective disposition of wealth by inter vivos gift and testamentary transfer; emphasis on income, estate, and gift tax considerations, use of the trust form in the transfer of wealth, use of insurance and jointly held property as part of the estate plan; planning for the continuation or disposition of the client's business interests. Preparation of an estate plan with supporting documents is the major project for the course. Prerequisite: Law 390 for 4 credit hours. Enrollment limited by the instructors. (Drafting assignments)
- 398 **Modern Real Estate Transactions (3)** Schiller  
Basic course in conveyancing. Current problems in purchase and sale of residential real estate, legal and equitable rights, responsibilities, liabilities, and remedies of buyer, seller, broker, escrow agent, conveyancing attorney, title examiner, abstractor, and lender; interim and permanent mortgage finance, discounts, points, "subject-to" and "assumptions," remedies on default, including foreclosure processes; process of examination and assurance of title and other interests in realty, including recording and title insurance systems; settlements and closings, warranties of title, encumbrances on title, and clearing of title; emerging problems related to cooperatives, condominiums, and property owners associations. (Examination) (Spring—day)
- 400 **Government Lawyering (2 or 3)**  
Focus on a range of topics unique to government or government litigation, including conflict of interest regulations and other ethical rules. Litigation topics may include sovereign immunity, litigating and settlement authority, intergovernmental and executive discovery privileges and problems, remedies, and misconduct defenses against government. Apart from litigation, topics may include access rights and exemptions under the Freedom of Information, Privacy, Sunshine, and Federal Advisory Committee Acts, civil service regulations and federal employee rights, the federal budget process, congressional oversight and investigatory authority, and executive regulatory oversight. Core public law courses such as Law 214, 232, and 342 are helpful but not required. Topic coverage and emphasis will vary with the instructor; see special posting for the current semester.
- 401 **Introduction to Quantitative Analysis for Lawyers (2 or 3)**  
Introductory course for lawyers that does not assume or require advanced mathematical skills. Application of non-legal methods of analysis in public policy problems with attendant evidentiary requirements, including the effective use of experts. Principal non-legal methods of policy analysis, including microeconomic analysis (basic price theory and industrial organization), financial analysis (including the roles of financial institutions), and statistical analysis. Introduction to basic analytic concepts and terminology; jargon, common applications of the analysis in the law, and practical problems of expert witnesses. Topic coverage and emphasis will vary with the instructor; see special posting for the current semester.
- 402 **Planning, Zoning, and Land Use Law (2)** Feola, Gordon  
Problems, solutions, emerging concepts, and constitutionality of land use regulations, including zoning, subdivisions, historic preservation, exactions, vested

rights, transfer of development rights, growth management, and urban and regional planning. This course provides the foundation for Law 404 and 408. (Writing assignments and examination) (Fall—evening)

**404 Land Use Administrative Process (2)**

Delaney, Kominers

Selected problems in urban development and housing, with particular emphasis on programs under current enabling legislation and federal and state court decisions. Analysis of various public and private decision processes through which conflicts over land use are resolved. Simulation of a complex zoning hearing. Prerequisite: Law 402 or permission of instructor. (Writing assignments)

**405 Housing Rights Seminar (2)**

Roisman

Judicial, statutory, and regulatory landmarks in the development of low-income housing law. The focus of the course is on government housing programs and policy. The instructor's objectives are to have each student understand domestic low-income housing principles and programs, engage in rigorous analysis of case law, statutes, and regulatory material, and comprehend the relationship among the courts, Congress, and executive and administrative agencies in the development of law and policy. In addition to housing law, students have an opportunity to learn about the Congressional Budget and Impoundment Control Act, the Administrative Procedure Act (in theory and practice), homelessness, and complex litigation and advocacy. (Research paper or examination)

**408 Land Development Law (4)**

Drachsler

Students participate in a semester-long simulation process encompassing 42 months of "game time." As junior associates in various hypothetical law firms or offices, students represent their assigned clients, with all interactions based on actual situations and often incorporating recent or ongoing cases of major significance. All levels of judicial, administrative, and legislative activity are involved. Enrollment limited by instructor. (Writing assignments) (Spring—day)

**409 Local Government Law (2)**

Raven-Hansen

Decision-making processes in metropolitan and other municipal-level governments, types and objectives of city, county, and special-function local government units; intra- and intergovernmental relations; initial organization and changes in form and function of local governments; personnel matters; local legislative and administrative authority and processes; financial processes; governmental vs. proprietary functions; responsibility in tort, insurance issues; introduction to community planning, extraterritorial powers, joint-power agreements and compacts. (Examination)

**410 Environmental Law (3)**

Turley

An introduction to the basic theories and statutes of environmental law, designed to develop an equal understanding of why and how environmental activity is regulated. There will be heavy focus on the reasons for regulation and the theories behind environmental protection. These theoretical foundations range from the economic school to the "eco-centric" school. The course begins with a discussion of common law remedies for environmental injuries such as nuisance and torts remedies. Turning to the regulatory alternative, the course will focus on a single primary command and control statute, the Clean Air Act, to emphasize the practical and legal issues surrounding the regulation of the environment. Other statutes, including the National Environmental Protection Act (NEPA), the Clean Water Act (CWA), and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) will also be discussed to a lesser extent. Not for credit toward an LL.M. in environmental law. (Examination) (Spring—day)

**414 Clinical Studies in Environmental Law (1, 2, 3, or 4)**

Reitze

The student works on a project in the environmental law field under the supervision of both the faculty director of the program and a lawyer practicing environmental law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public-interest environmental organization. Admission to the course requires second-year, third-year, or graduate standing and permission of the Director of the Environmental Law Program. Students who have mastered the fundamentals of environmental law are selected for this course. Normally this will require completion of at least Law 410. J.D. students may repeat the course for a maximum of 8 credit hours of credit. Students in the LL.M. in environmental law



program may earn no more than 4 credit hours of credit. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. Five hours of work per week are required for each credit. (Fall and spring—day; summer)

- 415 Occupational Safety and Health Legislation (2)**  
The Occupational Safety and Health Act of 1970 and related legislation. (Short papers)
- 420 Federal Income Taxation (3 or 4)** Sims, Block, Peroni  
Survey of substantive provisions of federal income tax law, including concept of gross income, provisions affecting taxation of family and individual transactions, limitations on allowable deductions, sales and dispositions of property, problems of capital gains taxation, nontaxable exchanges. (Examination) (Fall—day and evening; spring—day)
- 422 Federal Estate and Gift Taxation (2)** Nudelman  
Survey of substantive provisions of federal estate and gift tax laws, including inter vivos transfers, transfers in contemplation of death, joint interests, life insurance proceeds, property subject to powers of appointment, marital deduction, and split gifts. (Examination) (Spring—evening)
- 424 Federal Income Taxation of Corporations and Shareholders (3)** Painter  
Continuation of Law 420. Primary emphasis on corporate-shareholder relationships. Problems of corporate dividends, redemptions of stock, stock dividends, bail-outs, and dividends in kind. Federal income tax problems involved in the formation of corporations, the sale of corporate businesses (including collapsible corporations), mergers and acquisitions, and corporate divisions. Prerequisite: Law 420. (Examination) (Fall—evening)
- 426 Partnership and Subchapter S Corporation Taxation (2 or 3)** Sanders  
Income tax problems of partnerships and S corporations (Subchapters K and S of the Internal Revenue Code). Practice-oriented study of partnerships, including syndication, organization, and structure of entity, with emphasis on policy examination of areas of IRS principal concern, including tax shelters, disproportionate tax allocations, retroactive allocations, guaranteed payments to partners, contributions of capital, basis for gain or loss, passive activity loss, non-recourse financing, "at-risk" rules, current and liquidating distributions, sale of partnership interests, collapsible partnerships, "like-kind" exchanges, termination, special basis adjustments, and distributions to retiring or deceased partners. Planning-oriented analysis of Subchapter S, including procedures for electing and terminating Subchapter S status, treatment of income and losses, limitations on deductibility of losses, and how to avoid pitfalls. Prerequisite: Law 420; recommended: Law 424. (Examination) (Spring—evening)
- 428 Tax Policy Seminar (2)** Block  
Intensive study of selected aspects of the tax structure with primary attention given to the federal income tax. Problem areas are reviewed primarily from the standpoint of tax policy, including legal, economic, social, and practical considerations. Alternative solutions, including current legislative proposals, are examined. Prerequisite: Law 420. Recommended: Law 424. (Research paper) (Spring—day)
- 429 Labor Standards (2)** Ginsburg, Abrahams  
Analysis of the Fair Labor Standards Act—its scope, exemptions, and remedial procedures, the laws establishing labor standards for government contracts, including the Davis-Bacon Act, Walsh-Healey Act, Service Contract Act, and Work Hours Act, the role of the Department of Labor, the Comptroller General, and the contracting agencies in interpretation, administration, and enforcement of these statutes. (Examination)
- 431 Employment Discrimination Law (2 or 3)** Craver, Morris  
Federal laws and executive orders relating to various types of discrimination in employment, including Title VII of the Civil Rights Act of 1964, the Civil Rights Act of 1991, the Equal Pay Act, the Age Discrimination in Employment Act, the Rehabilitation Act, the Americans with Disabilities Act, the Civil Rights Act of 1866, the Fourteenth Amendment, the National Labor Relations Act, and Executive Orders 11,246 and 11,375 relating to government contractors; substantive rights, exemptions, and burdens of proof under the various laws and regulations. (Examination) (Fall—evening; spring—day)

- 433 Federal Indian Law Seminar (2)** Berkey  
Basic legal principles that govern the relationship between American Indian tribes, the federal government, and the state governments. Focus on jurisdictional disputes between those governments, the source and scope of Indian sovereignty, and recognition and enforcement of Indian land and treaty rights. (Research paper or examination)
- 434 Family Law (2 or 3)** Valdez, Cahn  
Focus on the law governing the family, in both disputes and public regulation. Marriage, divorce, child custody, child support, domestic violence, reproductive rights, and fathers' rights will be covered. The course will draw on historical and interdisciplinary materials, and will involve discussion of pressing public policy issues as well as current law. (Valdez—examination and project) (Cahn—examination) (Fall—day and evening)
- 435 Employee Benefit Plans and the Labor/Management Relationship (2)** Mackiewicz, Quinn  
The course begins with an examination of pre-ERISA benefit plans, the federal labor law governing those plans, and the conditions which led to the passage of ERISA and its effect on Taft-Hartley plans. Practical realities of collectively bargained benefit plans; preemption of state law and interplay of various federal laws; roles played by union and employer both in the context of individual bargaining of employee benefits and in the context of the employer and the union as trustee of a benefit plan, rights of participants and beneficiaries under the plan and under the collective bargaining agreement; rights and obligations of contributing employers; and termination and withdrawal issues, including plant shutdowns and bankruptcies. (Take-home examination) (Spring—day)
- 436 The Child, the Family, and the State (2)** Valdez  
Focus on the rights of children, particularly in the family and criminal law areas. Among the subjects covered are child custody, support, medical treatment, neglect, status offenders, and delinquency. (Examination or research paper) (Spring—day)
- 437 Law and Psychiatry Seminar (2)** Chambers, Wiener, Barber  
Designed to expose the lawyer to basic constructs of psychiatry and psychology and to explore their implications in legal rules and practice. Psychiatrists and psychologists actively involved in teaching process. Topics include psychological testing and other assessment techniques, psychiatric evaluations and reports, competency in civil and criminal contexts, criminal law matters (including criminal responsibility and dispositional issues), civil commitment, informed consent, and guardianship. Commercial and educational movies are utilized to illustrate psychiatric constructs and the workings of a particular mind. Emphasis is given to the more easily observable mental conditions of dementia, depression, and delirium in order to illustrate psychiatric diagnosis. There is ordinarily at least one session in a mental institution. (Examination) (Spring—day)
- 438 Comparative Law (3)** Brand  
Comparison of the world's major legal systems: civil, common, Islamic, and socialist. Consideration of the history and sources of law of each and a review, concentrating on the civil law system, of hallmark institutions, the role of lawyers, procedure, and selected substantive legal issues. Emphasis on issues and problems of the international lawyer, including conflicts among and harmonization of the legal systems, the migration of legal ideas, and pleading and proving foreign law. (Examination; research paper with permission of the instructor) (Spring—day)
- 440 Conflict of Laws (3)** Seidelson, Pock  
Legal problems arising from occurrences transcending state or national boundaries; jurisdiction; foreign judgments; constitutional influences; theoretical bases of choice of law principles and their application to specific fields, including torts, contracts, property, family law, administration of estates, business associations. (Examination) (Fall—evening; spring—day)
- 442 Jurisprudence (2 or 3)** Mitchell, Tuttle  
Basic jurisprudential concepts; nature of law; development of legal institutions; jurisprudential schools—natural law, analytical, historical, sociological, functional; law and logic, law and justice; the judicial process; legislative, executive, administrative decision-making; impact of politics, economics, and scientific



advance on legal systems; contemporary trends in jurisprudential thought. (Examination) (Fall—day; spring—day)

**443 Foreign Relations, National Security, and the Constitution (2)** Raven-Hansen

Examination of legal issues raised by national security abroad (including general war, imperfect war, covert war); internal security (including emergency powers, domestic uses of the military, surveillance and surreptitious entry, and federal personnel security); and access to national security information (the FOIA, state secrets privilege, prior restraints, and leak control). Includes study of those parts of foreign relations law that involve national security. (Examination) (Spring—day)

**444 International Law (3 or 4)** Steinhardt, Buergenthal, Alvarez

Introductory survey of the legal system governing relations among states and its expansion to non-state actors, such as international organizations, natural and juridical individuals, indigenous groups, and proto-states. Analysis of the sources of international law, including the formation of customary norms and techniques of treaty interpretation; the application and enforcement of international law in domestic courts, international tribunals, organizations, and diplomacy; doctrines of jurisdiction and immunities; the impact of emerging states and new technologies on doctrine; the use of force; human rights; constitutional aspects of international law; and recurring political and jurisprudential issues. (Examination) (Fall—day; spring—evening)

**446 International Business Transactions (3)** Spanogle, Steinhardt

U.S. law and practice relating to characteristic forms of international transactions, including the transnational sale of goods (the law governing the documentary sale, various forms of letters of credit, commercial terms and insurance); the export of technology through franchising, distributorship, and licensing contracts; and the export of capital through the establishment, operation, and withdrawal of foreign direct investment. The impact of relevant international organizations and/or emerging substantive international commercial law (e.g., the United Nations Convention on Contracts for the International Sale of Goods and other treaties on international negotiable instruments, international lease financing, and international factoring). Specialized problems in the negotiation and drafting of international contracts. (Examination) (Fall—evening; spring—day)

**447 International Organizations (2 or 3)** Alvarez

Analysis of characteristic legal issues arising out of the creation and operation of organizations of nation states. Included are issues of legal personality, treaty making and norm creation, privileges and immunities, membership, dispute settlement, and withdrawal. Exemplary problems in distinct institutional settings, including the United Nations, the International Labour Organization, the International Civil Aviation Organization, the Organization of Economic Cooperation and Development, the International Monetary Fund, and inter American organizations. (Examination or research paper) (Fall—day)

**448 International Arbitration (2)** Ristau

Survey of arbitration and related mechanisms of dispute resolution in the international legal system that arise out of commercial, financial, and governmental transactions. Analysis of the arbitration agreement, the process of arbitration, and the enforcement of arbitral awards as well as the common principles governing the disposition of claims. Review of the various arbitral tribunals and their rules. Prerequisite or concurrent registration: Law 444 or 446; for post-J.D. students, permission of instructor may be substituted. (Research paper or examination)

**449 International Civil Litigation (2)** Steinhardt

Analysis of the law relevant to the trial of cases having international elements in U.S. domestic courts, including the problems of establishing jurisdiction over foreign defendants, obtaining transnational discovery and service of process, enforcing foreign judgments, drafting and defending choice of forum and choice of law clauses, determining the extraterritorial reach of U.S. law, proving foreign law, and assessing the role of U.S. courts in deciding cases with potential consequences for U.S. foreign relations. Analysis of the impact of international issues on actual litigation as well as the initial structuring of a transaction in light of the client's potential litigation interests. Prerequisite or concurrent registra-

- tion. Law 444; for post-J.D. students, permission of instructor may be substituted. (Examination) (Fall—day)
- 450 Unfair Trade Practices (3)** Schechter  
 Unfair trade practices at common law and under modern legislation; privilege to enter markets and compete, interference with contractual relationships, trademarks and trade names, imitation of product appearance, misappropriation of ideas and trade secrets, right of publicity, basic copyright principles, protection of competitors and consumers against false advertising and unfair or deceptive practices under the Federal Trade Commission Act, the Trademark Act, and state unfair trade and consumer protection statutes, price and service discrimination under the Robinson-Patman Act and state legislation. Credit may not be earned for both Law 450 and 560. (Examination) (Spring—day)
- 452 Federal Antitrust Laws (3)** Morgan  
 Federal antitrust law and policy under the Sherman, Clayton, and FTC Acts, basic economic theory of free-market operation, the Rule of Reason and *per se* offenses, price fixing, market division, and boycotts, trade association activities, monopolization and attempts to monopolize, mergers and joint ventures, resale price maintenance and other vertical restraints, exclusive dealing and tie-in agreements, selected exemptions from antitrust liability. (Examination) (Fall—evening; spring—day)
- 454 Products Liability (2 or 3)** T. Schwartz  
 Development of the concept of products liability and consumer remedies. Survey of civil actions for harm resulting from defective and dangerous products in negligence, warranty, nuisance, fraud, misrepresentation, and other cases. Problems associated with hazard identification, insurance, and industry self-regulation. Review of current legislation dealing with injuries and remedies in specific areas. (Examination or research paper) (Fall—day)
- 455 Toxic Tort Litigation (2)** Hicks  
 The use of common law remedies to compensate those injured by diseases characterized by long latency periods and, usually, relatively low levels of exposure. Insurance, workers compensation, and evidentiary issues. (Examination) (Fall—day)
- 456 Professional Responsibility and Ethics Seminar (2)**  
 Selected topics in professional responsibility and ethics. Intensive study of questions of lawyer responsibility and ethics raised by professional codes and moral philosophy. Prerequisite: Law 222. (Research paper)
- 457 Jurisprudence Seminar (2 or 3)** Galston  
 Selected topics in legal theory to be chosen by the instructor. (Research paper or examination)
- 458 Feminist Legal Theory (2)** Ridder  
 Law and society studied from the point of view of women. The course focuses on feminist jurisprudential treatment of gender and examines the prospects for sex equality under the law. Enrollment limited to 25. (Research paper) (Spring—day)
- 460 Consumer Mediation Clinic (2 or 3)** Izumi  
 Open to second- and third-year students (first-year students may participate during the summer of their first year). Students act as neutral third parties who help consumers and businesses resolve disputes by negotiating mutually agreeable settlements. Students perform case intake, provide information and referrals, and mediate assigned cases involving a variety of consumer issues (debt collection, credit problems, defective goods and services, home improvement contracts, etc.). Students develop problem-solving techniques as they apply local and federal consumer laws. Students must complete four hours of clinic work per week for each credit earned (includes mandatory seminar) and must present a brief paper analyzing one of their cases. Advanced students may have an opportunity to conduct mediation sessions for consumer cases filed in the D.C. Department of Consumer and Regulatory Affairs Complaint Division. Students work under the guidance of a supervising attorney with the help of more experienced student directors who also provide administrative support. Permission of the instructor required prior to registration. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. (Fall, spring)



- 461 Small Business Clinic (2, 3, or 4)** Jones  
Under the supervision of the instructor, students assist small businesses and nonprofit organizations with a wide variety of legal issues, including drafting incorporation and partnership papers (such as articles of incorporation and bylaws), compliance with local licensing requirements, reviewing and drafting contracts and leases, advising on tax problems and related matters. 15-20 hours of work per week required. Prerequisite: Law 325 and 420 and permission of instructor. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. (Fall, spring)
- 463 Outside Placement (1, 2, 3, or 4)** Sullivan  
Students arrange independent projects with state or federal public interest organizations for academic credit. A compilation of suggested projects is available at the Community Legal Clinics office. Projects must receive prior approval by the instructor. Students who wish to work with the bankruptcy division of *Law Students in Court* for 2 or 3 credits should register for this course. The grade of *CR* (Credit) or *NC* (No Credit) is given for this course. Students may earn no more than a total of eight credit hours in this course. (Fall, spring, summer)
- 464 Patent Law (2 or 3)** Wegner, Schaffner  
An overview of patent law designed for students without a patent background, including those without a technical background. Analysis of the goals and costs of the patent law system. Topics include patentability requirements, infringement, remedies, patent prosecution issues, and patent transactions. (Examination) (Fall—evening; spring—day)
- 466 Patent Policy and Practice (2)**  
Patent practice issues, with emphasis on policy considerations. The course is taught from the perspective of electronics cases, including claim craftsmanship and consequences. (Examination) (Spring, even years—evening)
- 468 Computer Law (3)** Chandler  
A critical study of selected major legal problems presented by computer technology, including the impact upon legal doctrine and legal institutions, jurisprudence, the theory of various uses that are and may be made of computers in legal research, the practice of law, and court administration will be examined. Familiarity with the rudiments of computer science or programming would be helpful, but is not required. (Examination)
- 469 Law of Privacy Seminar (2)** Park  
A review of the law of privacy as it has developed in constitutional litigation, tort law, and state and federal statutes. Current developments and rationales for further expansions of privacy rights are considered. Course materials and class discussions provide structure for both research papers and examinations. (Research paper or take-home examination) (Fall—day)
- 470 Medicine for Lawyers (2)**  
Survey of the basic medical sciences and the rudiments of clinical medicine as encountered in the practice of law. Medical terminology, the disease process, trauma, and industrial medicine. The application of this fundamental information is demonstrated in personal injury or negligence and malpractice litigation as well as in commitment and equitable proceedings. Emphasis on enabling the lawyer to communicate most effectively with medical specialists. (Examination)
- 472 Law and Medicine (2)** Michaelson  
Defining and regulating the quality of health care, the tort liability of medical professionals and institutions, confidentiality, disclosure and informed consent, tort reform, the structure of health services delivery, insurance options, problems of access and cost, antitrust issues, personhood, reproduction, human experimentation and patients' rights, death, dying, advanced technology and the limits of intervention, hard choices and public policy. (Examination or writing assignments) (Spring—evening)
- 473 Law and Psychology (2)**  
Study of the interaction between psychology and law. Issues include eyewitness identification; hypnotically induced testimony; polygraphs and lie detection in general; jury selection; jury decision making (including the effects of jury size and unanimity requirements); death qualified juries; foreseeability; procedural justice, predicting dangerousness, judgments of responsibility, and battered woman syndrome. (Research paper) (Spring—evening)

- 474 Drugs and the Law Seminar (2)** Sirulnik, Meyers  
A study of federal and state laws controlling illicit drugs, including the historical evolution of these laws, current offenses and penalties, constitutional limits on the criminal sanction, enforcement practices, and sentencing considerations. Alternative models for controlling drugs, including decriminalization and legalization will also be studied. Six class sessions will be devoted to mock criminal trials at which student teams conduct direct and cross-examination of guest expert witnesses in the field. Other students may be assigned to internships with the U.S. Attorney's Office, Public Defender Service, or other institutions involved in drug law or policy. All participants will be graded on the basis of assigned memoranda pertaining to the legal issues involved in the mock hearings or internships, or special research papers assigned by the instructors. Prerequisite: Law 232. (Writing assignments) (Spring—day)
- 475 Law, Science, and Technology Seminar (2)** Green, Ehrlich  
Reciprocal relationships between law and science, absorption of scientific concepts into substantive law through adjudication, legislation, and rule-making techniques and procedures used in handling, developing, and deciding scientific issues. (Research paper) (Spring—day)
- 476 Prisoners Project (1, 2, or 3)** Turley  
Open to second- and third-year students. A clinical project concerned with the legal status of older prisoners (over 55 years of age). The project works for the release of high-cost, low-risk prisoners into stable environments. Students work on either individual cases or research. Case workers interview prisoners to evaluate and prepare cases for pardon, parole, or possible *habeas* appeals. Research projects will cover subjects ranging from overcrowding to health care to risk assessment. Some legislative work is also possible. (Fall, spring, summer)
- 477 Federal Sentencing Seminar (2)** Gelacek  
A review of the history of structuring judicial discretion at sentencing and of extant theories of sentencing will provide the background against which to understand and evaluate the new federal sentencing guidelines. An in-depth examination of the Sentencing Reform Act of 1984 will be followed by a review of the structure of the federal sentencing guidelines and the key policy issues that guided their development. Prerequisite: Law 217 or permission of the instructor. (Research paper) (Fall—day)
- 478 Law and Criminology: Search for the Causes of Criminal Behavior (2)** Courtless  
The role that criminological knowledge of crime causation may play in assisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such causal theories. (Research paper) (Fall—day)
- 479 Law of Criminal Corrections: Society's Responses to the Criminal Offender (2)** Courtless  
Study of the development and current use of society's three major approaches to the handling of offenders: punitive, incapacitating, and correctional. Emphasis on society's changing responses to criminal and delinquent behavior, research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavioral scientists charged with effectuating these strategies. Prerequisite: Law 478. (Research paper)
- 480 White Collar Crime Seminar (2)** Casino  
Definition, prosecution, and sanctioning of federal corporate and white collar crime offenses. Examination of special problems in the prosecution and the defense of such offenses. Exploration of primary white collar offenses in the federal system, e.g., mail and wire fraud, securities fraud, insider trading, bribery of public officials, and environmental crimes. Examination of sanctions for corporate and individual offenders. (Research paper or examination) (Spring—day)



- 482 Disabled People and the Law (2)** Banzhaf  
 Examination of those areas in which persons with disabilities have traditionally been denied some right or benefit afforded other persons in our society and have resorted to legal action, introduction to statutes and agencies designed to protect people with disabilities. Students may choose to prepare a research paper (and receive legal writing credit and a numerical grade) or to gain practical experience doing a clinical project (on a *CR/NC* basis). (Spring—day)
- 483 National Center for Law and the Deaf** Banzhaf  
**Clinical Education Activities (1, 2, or 3)**  
 Work with the National Center for Law and the Deaf in bringing legal information, services, and representation to the more than 13 million Americans who are deaf or hearing-impaired. The Center is designed to help make the hearing-impaired aware of their legal rights and to assist them in solving their legal and law-related problems. Students may participate in one or more projects: (1) counseling persons with hearing impairments about legal problems at a walk-in clinic usually held on the Gallaudet College campus, (2) preparing and participating in workshops for hearing-impaired persons to acquaint them with their rights and obligations under the law, (3) assisting in representing the interests of deaf and hearing-impaired persons in judicial and administrative proceedings, (4) preparing research papers on topics related to law and the deaf or preparing handbooks explaining legal topics to the hearing-impaired. Students may learn some sign language but will be assisted by trained translators when dealing with deaf individuals. Approximately 60 hours of work per semester is required for each credit hour. Students may repeat this course for a maximum of 8 credit hours of credit. This course may not be taken at the same time as Law 495 or any litigating activities in Law 493. The grade of *CR* (Credit) or *NC* (No Credit) is given for this course. (Fall and spring)
- 484 Gender Discrimination and the Law (2)** Ridder  
 An examination of the treatment of women in all areas of the law and legal remedies for sex discrimination. Emphasis on constitutional law, family law, and discrimination in employment. Enrollment limited to 30 students. (Examination or research paper) (Fall—day)
- 485 Comparative Public Procurement (2)**  
 A comparative study of laws, regulations, and procedures dealing with public procurement, examination of special problems encountered in business dealings with sovereign states, analysis of contract formation, performance, and dispute resolution processes, consideration of influence of international organizations such as the European Economic Community (EEC), United Nations Commission on International Trade Law (UNCITRAL), General Agreement on Tariffs and Trade (GATT), financing institutions, and professional organizations; identification of differences between national and international procurement practices. Prerequisite or concurrent registration: Law 444, 486 or 487, or permission of instructor. (Problem assignments)
- 486 Government Contracts (3)** J. Schwartz  
 Survey of the basic principles of government procurement, including the powers and limitations on government instrumentalities entering into contracts, the respective roles of the three branches of government in the process, the processes of contract formation and administration, the resolution of disputes arising out of both processes, and the various forums available for dispute resolution. Although the focus of this course is primarily on federal government procurement, there will be some consideration of state and local government contracting and may be some coverage of procurement by other nations or international organizations. This course covers some of the material covered in Law 487 and 488, but at an introductory level. Not open to students in the LL.M. program in government procurement law. (Examination and problem assignments) (Spring—day)
- 487 Government Procurement Law (4)** Lees, T. Miller  
 Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discussion of the functions of Congress, the executive branch, and the courts in the procurement process. The course focuses on the contract formation process, including tech-

- niques for awarding contracts and litigation and protests involving awards. (Examination and problem assignments) (Fall—evening)
- 488 **Performance of Government Contracts (4)** Lees, T. Miller  
Discussion of the substantive problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses; analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. Analysis of the methods that can be used by the parties to a government contract to obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief. (Examination and problem assignments) (Spring—evenings)
- 490 **Government Contracts Seminar (2)** Lees  
Research and discussion of selected problem areas. (Research paper) (Spring—day)
- 491 **Government Contracts Cost and Pricing (2)** Knight  
Legal aspects of government contract accounting principles and allowability of costs. Cost accounting standards and cost allocation issues. Negotiation of cost, profit, and price. Disclosure of cost accounting data. (Problem assignments) (Fall—evening)
- 492 **Intensive Clinical Placement (arr.)** Staff  
Projects involving litigation, research, or public interest activities of a legal nature (including aid to indigents, support of public interest nonprofit corporations, and support of governmental agencies or courts) may be initiated and will be supervised by a faculty member. Projects must be approved in advance by the Law Center Supervisory Committee (three members) both as to whether the project is appropriate and as to the number of credit hours of credit to be granted. A maximum of 10 credit hours of credit may be taken in one or two semesters. This course is open to a limited number of third-year law students. The grade *CR* (Credit) or *NC* (No Credit) is given for this course (Fall, spring, summer)
- 493 **Administrative Advocacy Clinic (2)** Sullivan, Masner  
This clinic allows second- and third-year students to represent indigent and elderly claimants in a variety of administrative forums. Under the supervision of clinical faculty, students work on cases for clients who have benefit claims before state and federal agencies. Students work in the areas of Social Security disability, Unemployment Compensation, Medicaid and Medicare, Aid to Families with Dependent Children, and other public benefits programs. Students also gain experience drafting wills, powers of attorney, living wills, and other legal documents. Students are expected to work 8 hours per week and attend a two-hour seminar, in which they learn substantive law and participate in simulation exercises to complement their clinical work. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course (Fall, spring, summer)
- 494 **Immigration Clinic (2, 3, or 4)** Grussendorf  
Clinical work includes representation of clients at deportation hearings and oral arguments before the Board of Immigration Appeals and U.S. Court of Appeals. Students assist aliens with a variety of problems, including political asylum applications and adjustment of status from that of nonimmigrant to immigrant. The clinic emphasizes court exposure for the student. Ten to 20 hours of work per week, a two-hour weekly seminar, and an additional weekly meeting with the supervising attorney are required. Permission of the instructor required prior to registration. Prerequisite or concurrent registration: Law 360. The grade of *H* (Honors), *P* (Pass), *LP* (Low Pass), or *NC* (No Credit) is given for this course. (Fall and spring)
- 495 **Law Students in Court (4)** Hay  
A clinical program in trial advocacy, offering an opportunity to develop skills as a trial lawyer while representing indigent persons in the Superior Court of the District of Columbia. Students may participate in either the civil division (which focuses primarily upon the representation of tenants in landlord-tenant actions, but also handles some consumer, negligence, and other civil matters) or the criminal division (in which student litigators defend persons charged with misdemeanor offenses). Students in both divisions have the opportunity to participate in jury trials. They are responsible for all aspects of litigation under



the supervision of clinical instructors: interviewing clients and witnesses, conducting investigations, preparing pleadings, engaging in settlement negotiations or plea bargaining, and conducting all motions hearings and trials pursuant to the Superior Court's third-year practice rule. Only third-year students who have completed Law 216, 217, 218, 219, and 232 may participate in the clinic. Seminars are held in the civil division on Monday evenings and in the criminal division on Wednesday evenings. Students must have one day per week available for court appearances and plan to devote approximately 20 hours per week to the clinic. Students must participate in the program for two consecutive semesters, beginning in either the summer or fall. Application must be made during the spring semester of the preceding academic year. This course may not be taken at the same time as Law 497 or any litigating activities in Law 493. Enrollment is limited, with selection by lottery. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. For the bankruptcy division of *Law Students in Court*, see Law 463, *Outside Placement*. (Fall, spring, summer)

**496 Civil Rights Externship (2, 3, or 4) Sirulnik and Staff**

Clinical problems concerned with the legal problems of minorities, women, and the poor. Students work with organizations such as the Lawyers Committee for Civil Rights Under Law, Women's Legal Defense Fund, Civil Rights Division of the Justice Department, Institute for the Development of Indian Law, National Committee Against Discrimination in Housing, and National Senior Citizens Law Center. Approximately 60 hours of work per semester are required for each credit hour. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. Permission of the instructor is required prior to registration. (Fall, spring, summer)

**497 Civil and Family Litigation Clinic (4) Meier, Strand**

Open to third-year students. Participants represent indigent litigants in D.C. Superior Court. Students are exposed to a range of cases in the Family Division (divorce, custody, child support, alimony), the Intra Family Branch (domestic violence), and the Civil Division (landlord-tenant, small claims, negligence, consumer, property disputes). Work responsibilities include client interviewing, investigation, settlement negotiations, drafting of initial pleadings and motions, as well as conducting actual hearings and trials. Students must have 16 hours per week to devote to this clinic and must participate for both fall and spring semesters. Participation is by permission of the instructor; applications must be submitted during the spring of the preceding academic year. Prerequisite: Law 216, 217, 218, 219, and 232. Law 311 is strongly recommended. Four graded credits are awarded for each semester's work in this course. (Fall, spring, summer)

**498 Legal Activism (2 or 3) Banzhaf**

Study of the legal process, not to benefit individual clients, but as a powerful tool for affecting social change and advancing the public interest. Topics discussed in a two-hour seminar meeting each week include principles of maximizing legal leverage, legal judo, guerrilla law, working with the press and members of Congress, drafting of legal documents, unusual legal tools and tactics, negotiation, making money from public interest law, etc. Students may choose to bring a public interest legal action before an agency or in court or may undertake another legal action project for 3 credits and receive a numerical grade. Alternatively, students may do research on a topic related to public interest law for 2 credits on a *CR/NC* basis. (Fall—day)

**499 Federal, Criminal, and Appellate Clinic (4) Lyman**

Open to third-year students with permission of the instructor. Students must apply during the spring semester of the preceding year. Students develop both trial-level and appellate-level advocacy skills while working on actual cases. Trial work is done primarily in the U.S. District Court (D.C.) and includes interviewing and counseling, investigation, preparation of pleadings and discovery, and participation in hearings and trials. Appellate work is primarily before the D.C. Court of Appeals and U.S. Court of Veterans Appeals. It includes review of the trial transcript, preparation of briefs, and oral argument. Students must devote approximately 16 hours per week to this course. A weekly seminar includes reading assignments, role-playing and other simulations, and written exercises.

Must be taken for 4 credits per semester for the full academic year. Prerequisite: Law 216, 217, 218, and 232. (Fall and spring)

- 501 Public Economic Policy and the Law (2)** D. Peterson  
Interrelation of law and economics in such subject-matter categories and decisional contexts as economic regulation of industry, fiscal policy planning, government research and development practices, foreign trade and investment, and public spending priorities. (Research paper) (Spring—evening)
- 502 Law and Economics (2)** Peroni  
Theoretical applications of economic analysis in the study of legal problems and legal institutions. Social welfare theory and basic microeconomic theory are used to explore the common law. For students with no previous economic training. (Examination) (Fall—day)
- 504 Public International Law Seminar (2)**  
Group study of contemporary problems in the theory and practice of international law. Limited enrollment. Prerequisite: Law 444 or permission of instructor. (Research paper or examination)
- 505 International and U.S. Regulation of Foreign Trade (2)** Spanogle  
Study of domestic and international laws and institutions governing foreign trade. Included are the legal consequences of U.S. participation in the GATT, UNCTAD, and other international forums, laws regulating customs and tariffs, government procurement, subsidies, dumping, unfair foreign trade practices, disruptive imports under the escape clause, East-West trade, the generalized system of preferences, most-favored nation treatment, exports under the Export Administration Act, and foreign assets control, the impact of Friendship, Commerce, and Navigation treaties. Specialized problems in regulating boycotts, foreign corrupt practices, and restrictive business practices. Prerequisite or concurrent registration: Law 446, permission of instructor may be substituted. (Examination) (Spring—day)
- 506 International Business Transactions Seminar (2)**  
Group study of contemporary problems in international business law and practice. Limited enrollment. Prerequisite: Law 446 or permission of instructor. (Research paper or examination)
- 507 Regulation of Investment Advisers and Investment Companies (2)**  
Applicability of the Investment Company Act of 1940 to particular business activities that may bring an entity within the statutory definition of investment company, litigation as to fees, policy considerations relating to front-end loads; SEC regulations regarding advertising and promotion, restrictions on activities by affiliates, and current SEC disclosure requirements. Applicability of the Investment Advisers Act of 1940 to activities of individuals and entities, procedures for compliance; First Amendment issues raised by SEC enforcement actions; and civil liability under the antifraud provisions of the securities laws. (Examination)
- 508 Health Care Delivery Systems Seminar (2 or 3)** Budetti  
Survey of the history, structure, and operation of the health care delivery system, and related legal and policy issues. Students will gain familiarity with the concepts and terms of health care delivery, particularly with respect to the design, finance, and administration of current and proposed arrangements. (Examination or examination and research paper) (Fall—day)
- 509 Food and Drug Law (2)** Levine, Safir  
Consideration of the standards of federal law applicable to the compositional and representational elements of foods, drugs, medical devices, and cosmetics. Provisions of the Federal Food, Drug, and Cosmetic Act, their development, application, and judicial and administrative interpretation. (Research paper or examination) (Spring—evening)
- 532 The Crime Lab, the Forensic Scientist, and the Criminal Lawyer (2)** Starrs, Melson  
Designed to acquaint the student with the operations of a modern crime laboratory and the courtroom acceptability of testimony of forensic scientists and other evidence on laboratory test results. Identification of individuals (fingerprints, palmprints, footprints, voiceprints, anthropological reconstruction, hair identification, and serology), identification of objects (ballistics, handwriting, typewriting, fiber identification, paints, varnishes, glass, wood, and paper), toxicology, pathology, forensic use of the microscope and the camera, the coroner and the



- medical examiner systems, and drug law enforcement. Visual aids, crime laboratory guest lecturers, and field trips to crime laboratories. (Research paper or examination at the discretion of the instructor) (Fall—evening, spring—day)
- 535 Environmental Crimes (2)** Turley, Mushal  
Focus on the environmental criminal provisions of the various federal statutes, including the "mechanics" of a federal investigation and prosecution of an environmental felon as well as the rationale for criminal penalties in the environmental area. Students work on limited litigation projects. Students who complete this course are eligible to enroll in Law 536, where they would work exclusively on litigation or legislative projects with the instructor. Prerequisite or concurrent registration: Law 410. (Writing and project assignments) (Spring)
- 536 Environmental Crimes Project (1 or 2)** Turley  
Focus on litigation and legislative projects relating to environmental crime. Students work on federal or state legislation to enhance both the existing environmental criminal laws and the resources available for their enforcement. Students also work with the instructor on developing environmental criminal cases around the country. Prerequisite: Law 410 and 535. The instructor's approval is required for enrollment. The grade CR (Credit) or NC (No Credit) is given for this course. (Writing and project assignments) (Spring)
- 538 Law of Real Estate Financing (2)** Carroll, Stuart  
Types of lenders, choice of entity, construction loans, permanent financing, lenders' obligations, remedies, and liabilities, title insurance, survey, and liens, ground lease and commercial lease/leasehold mortgage, joint ventures, alternate capital formation; opinion letters. (Examination) (Spring—evening)
- 539 Water Pollution Control (2)** Grumbles  
Introduction to water pollution control and the Clean Water Act. (Examination) (Fall—evening)
- 540 Air Pollution Control (2)** Reitze  
An in-depth analysis of the Clean Air Act. Topics include standard-setting, state implementation plans, acid rain controls, and CFC and global warming issues. (Examination) (Fall—day)
- 541 Environmental Remedies (2)** Reitze  
A study of the tools available in the legal system to protect the environment. It will cover common law remedies, equitable remedies, the trust doctrine, local government powers, and land use control. The enforcement of environmental statutes to include inspections, record keeping, monitoring, compliance orders, civil penalties, permit revocation, and criminal penalties will be analyzed. (Examination) (Spring—day)
- 542 Environmental Issues in Business Transactions (2)** Geltman  
Focus on aspects of environmental law of particular concern to lawyers handling business transactions. Topics covered will include corporate environmental audits, securities disclosure issues, lender liability, environmental liability for purchases of stock or corporate assets, environmental problems of real estate transactions, partnership liability, bankruptcy issues, and insurance coverage for environmental liabilities. Prerequisite: Law 410 or equivalent. (Examination) (Spring—evening)
- 543 Water Resources Law (2)** Wood, Muys  
Federal and state powers over water, riparian and prior appropriation doctrines, Federal permit programs and wetland protection. Environmental problems concerning water quantity. Recommended as an introductory course. (Examination) (Spring—evening)
- 544 Environmental Planning (2)** Kussy, Hourclé  
Impact of environmental laws on government decision making, including administrative law issues, comprehensive transportation planning, the National Environmental Policy Act, historic preservation, parkland protection, the Coastal Zone Management Act, wetland protection, farmland protection, the Endangered Species Act and other wildlife issues, mitigation of environmental impacts, role of governmental policies relating to the environment, legislative issues, and state environmental laws. (Hourclé—focus on environmental planning issues faced by federal facilities) (Examination) (Fall—evening, spring—day)

- 545 Regulation of Pesticides and Industrial Chemicals (FIFRA & TSCA) (2)** T Johnston, Fleuchaus  
Examination of federal regulation of pesticides and industrial chemicals. The portion of the course pertaining to pesticides focuses on the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug, and Cosmetic Act (FFDCA); how risk assessment is used in the registration and cancellation of pesticides under FIFRA and tolerance setting under FFDCA. The second portion of the course focuses on the Toxic Substances Control Act (TSCA) and how it affects commercial production, processing, distribution, and use of chemicals. (Examination) (Fall—evening)
- 546 Natural Resources Law I (2)** Sheldon, Dreher  
Introduction to federal public lands and their multiple commodity uses: forestry, grazing, water, mining. Principles of congressional and state authority over these lands. Class focus on topical case studies and statutory materials. Recommended as an introductory course. (Examination) (Fall—evening)
- 547 Natural Resources Law II (2)** Sheldon, Dreher  
A study of the recreational and preservationist uses of public lands. The Wilderness Act, National Park legislation and similar laws will be examined. Federal wildlife refuges and wildlife funding laws. Fish and Wildlife Coordination Act, NEPA, Endangered Species Act. Marine mammal protection. International, federal, and state enforcement of wildlife laws. (Examination) (Spring—evening)
- 548 Control of Solid and Hazardous Wastes (RCRA & CERCLA) (2)** Hourclé, M. Strand, Gutter, Lowrance  
Analysis of the federal and state laws and regulatory schemes relating to the control of toxic and hazardous substances. The Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act ("Superfund") are examined. (Hourclé, Strand—focus on RCRA and CERCLA issues faced by federal facilities) (Research paper) (Fall—day; spring—evening)
- 549 Energy Law (2)** Hollis, Benkin  
Survey of federal regulation of the major energy industries. Emphasis on federal controls affecting the natural gas, coal, oil, synthetic fuel, and electric industries. The course approaches energy regulation from a statutory and case standpoint, and also deals with practical, procedural issues. Enrollment is limited to 35 students. Recommended for third-year students. (Examination) (Fall—evening)
- 550 Use and Control of Nuclear Energy (2)** Malsch  
Analysis of the legal framework for regulation of nuclear energy in the United States and for dealing with proliferation of nuclear weapons abroad. Discussion of substantive technical and policy issues relating to nuclear power reactor safety, disposal of radioactive waste, and safeguarding nuclear installations against domestic nuclear terrorism. Focus of the legal discussion is on the U.S. Nuclear Regulatory Commission. Includes such topics as federal preemption, impact of the National Environmental Policy Act of 1969, conduct of adjudicatory hearings under the Administrative Procedure Act, compensation for injuries from nuclear accidents, and precensuring antitrust reviews. (Research paper) (Spring—evening)
- 551 International and Comparative Environmental Law (2)** A. Miller  
Environmental law of the United States, foreign and domestic environmental law of Japan, and international environmental law of the European community. The course considers differences in implementation and enforcement of domestic environmental law under the federal system of government in the United States and the central system of government in Japan as well as differences in implementation and enforcement of domestic and international environmental law. In comparing domestic and international environmental laws, toxic substance and pesticide legislation in the United States, Japan, and the European community is covered. (Research paper) (Spring—day)
- 552 Licensing of Intellectual Property Rights (2)** Brunsvold  
The legal context of licensing situations, rights and duties of parties to license; appropriate terms and conditions in contracts; antitrust and misuse constraints,



- including international considerations for Europe and Japan, and selected policy and practice considerations in international licensing (Examination) (Spring, odd years—evening)
- 553 **Chemical and Biotech Patent Policy and Practice (2)** Wegner, Griffen  
Public policy and practice considerations relating to patenting biotechnology and chemical inventions with in depth treatment of unique practice areas. (Examination) (Spring, odd years—evening)
- 554 **Comparative Patent Law Seminar (2)** Wegner  
In depth study of current topics of patent harmonization, Japanese and European patent infringement cases, comparative analysis of U.S. law (and proposed statutory changes). Open to graduate students, J.D. students may enroll only with the prior permission of the instructor. (Spring—evening)
- 556 **Patent Enforcement (2)** Lupo, Tanguay  
Patent litigation for those who may wish to specialize in general litigation with occasional handling of patent cases, as well as for those interested in a patent solicitation career. Focuses on a rounded understanding of policy and practice considerations in the enforcement of patents. (Examination) (Spring—evening)
- 557 **Electronics and Computers: Policy and Practice (2)**  
A patent side perspective on computer and electronics issues with a comparative and international focus. Attention to public policy and practice issues relating to software and semiconductor chips, patent vs. copyright vs.  *sui generis*  protection debate for software protection, both domestically and internationally, consideration of relevant intellectual property treaties. Patent background is helpful but not required. Open to LL.M. students, J.D. students may enroll only with permission of the instructor. (Research paper) (Fall, even years—evening)
- 558 **International and Comparative Patent Law (2)** Salmon, Kushan  
A study of patent reform issues including domestic patent reform legislation and ongoing harmonization treaty discussions under WIPO, review of selected topics with comparative study from viewpoint of Japan, the United States, and Europe (Research paper) (Fall—evening)
- 559 **Copyright Law (2 or 3)** Schechter, Oman, Oler  
Historical background and general survey, how copyright is secured and maintained, subject matter of copyright, scope of protection, duration, renewal, and termination of transfers; jurisdiction and remedies; contracts and combinations, including compulsory licenses and performing rights societies, other doctrines neighboring on copyright, international aspects of copyright, including the Berne convention and other treaties on copyright and related subjects. (Examination) (Fall—evening; spring—day)
- 560 **Trademark Law (2)** Samuels  
Procedural and substantive law on use, registration, and protection of trademarks, including the registration procedure in the U.S. and foreign offices. The law of domestic and foreign licensing and franchising arrangements relating to trademarks. Credit may not be earned for both Law 450 and 560. (Examination) (Fall, odd years—evening)
- 561 **Law of the European Communities (2)** Schneebaum  
Study of the European Communities' law-making structure and substantive doctrines of EC law (e.g., antitrust, insider trading, director liability, unionization, workers' rights, and transborder data flow). (Examination or research paper with the permission of the instructor) (Spring—evening)
- 562 **Law of Japan (2)**  
An introduction to the constitutional structure of Japan, including political institutions and the judicial system, the legal profession, criminal law, domestic relations, business organizations, commercial law, administrative regulation, taxation, dispute resolution, intellectual property, restrictive business practices, and trade. (Research paper or examination)
- 565 **International Law of Human Rights (2 or 3)** Buergenthal  
Development of the rights of man from Grotius through the American and French Revolutions to the work of the United Nations in the field of human rights, the individual vis-à-vis the state, the regional approach to international protection of human rights, with emphasis on the European Convention, the inter-American, African, and Socialist approaches, human rights in armed conflict, and

- terrorism as a basic deprivation of human rights. Prerequisite or concurrent registration: Law 444; for Post-J.D. students, permission of instructor may be substituted. (Examination) (Spring—day)
- 566 **International Law of Air and Space (2)** M. Smith  
Study of the development of international law related to the use of air space and outer space; analysis of air and space treaties in force; the role of various intergovernmental and nongovernmental international organizations; consideration of special problems such as liability resulting from space activities, space technology and arms control, and pollution and contamination of outer space; earth resources, sensing, etc. Enrollment limited to 25 students. Prerequisite or concurrent registration: Law 444; for Post-J.D. students, permission of instructor may be substituted. (Research paper) (Spring—evening)
- 567 **International Law of the Sea (2)** Connelly  
International law related to the use of ocean space. Development of international law concerning internal waters, territorial sea, contiguous zone, high seas, continental shelf, fisheries, exclusive economic zone, maritime boundaries, marine environment, marine scientific research, deep seabed, and settlement of disputes. Current legal and policy issues associated with these areas. Prerequisite or concurrent registration: Law 444; for Post-J.D. students, permission of instructor may be substituted. (Spring—evening)
- 568 **International Humanitarian Law (2)** Parks  
Human rights law in international and internal armed conflict, examining the origins of the law of war, the 1949 Geneva Conventions for the Protection of War Victims, the Geneva Protocols of 1977, the 1980 Geneva Conventional Weapons Convention, other treaties and customary international law relating to means and methods of warfare, the role of the International Committee of the Red Cross, war crimes and enforcement mechanisms, and current problems in the regulation of hostilities. (Research paper) (Fall—day)
- 571 **International Negotiations (2)**  
The art and science of international negotiations from a practitioner's perspective; analysis of the roles of the legislative and executive branches; examination of the inter- and intra-agency processes, including pre-, during, and post-negotiation; impact of external influences; Panama Canal Treaties; Law of the Sea Treaty; arms control negotiations, with a case study of the Philippines Base Negotiations. Practical exercises in negotiations. Prerequisite or concurrent registration: Law 444 or 446; for graduate law students, permission of instructor may be substituted. (Research paper)
- 572 **Telecommunications Law (2)** Symons  
Federal regulation of the broadcasting, cable, and telephone industries. Topics include the licensing process, content regulation and political broadcasting rules, structural regulation of the broadcasting industry, cable franchising, rules governing the relationship between the cable and broadcasting industries, FCC and judicial responses to the growth of competition in the telephone industry; and the divestiture of AT&T. (Examination) (Spring—evening)
- 573 **Taxation—Timing of Income and Deductions (2)**  
Problems involved in assigning items of income and deduction to the proper taxable year. General implications of timing differences, annual accounting periods, methods of accounting (particularly the cash method and the accrual method), constructive receipt and the cash equivalency doctrine, transactional problems (including the tax benefit rule and claim of right doctrine), the installment method of reporting gain, cost recovery (including depreciation), and changes in accounting periods and methods. Net operating losses and inventory accounting may also be considered. While this course entails some coverage of widely used accounting methods, it is directed principally at accounting aspects of federal taxation. Students interested primarily in securing a familiarity with financial accounting precepts should instead take Law 324, *Law and Accounting*. Prerequisite: Law 420 or its equivalent. (Examination)
- 575 **International Banking (2)** Effros  
Study of the international monetary system, including the IMF and allied institutions and both international loan transactions and the regulation of international financing organizations. Issues arising out of exchange risk and claims valued in foreign currency, counseling approaches to such risks, the Eurodollar market,



and the structure and terms of international loans and banking institutions. Comparisons of different national approaches to bank regulation, cooperation of regulators in supervising international banking activity, and the effect of such activity on the U.S. banking system and debtor nations. Prerequisite: Law 446 or permission of the instructor. (Examination or research paper) (Spring—day)

**576 Foreign Direct Investment (2)**

**Hansen**

An examination of the legal, business, and financial problems involved in investing across national borders. Focuses on the strategies and techniques for structuring and financing such investments and on the framework of regulation that affects such investments. The analysis will include U.S. regulation of foreign investors, different types of foreign regulation of U.S. investments, and international controls on domestic regulation of foreign investment through treaties and conventions. Both actual and hypothetical transnational investments will be used to illustrate recurrent issues. A mock negotiation may be included. Prerequisite: Law 446 or permission of the instructor. (Research paper or examination) (Fall—evening)

**577 Special Corporate Taxation Problems (2)**

Issues related to restructurings, acquisitions (taxable and tax free), liquidations, contributions to capital, consolidated returns (filing, deferred intercompany transactions, and losses), allocation of income and deductions among related taxpayers, net operating losses, and classification of instruments as debt or equity. Other issues will be considered, based on the current state and application of the federal income tax laws. Such issues have included the rules regarding the time value of money, Subchapter S corporations, and controlled foreign corporations. Prerequisite: Law 424. (Research paper or examination)

**578 Nonprofit Organizations: Law and Taxation (2)**

**Galston**

Study of charities and other nonprofits as regulated by both federal and state laws. Topics include tax status of nonprofits, fiduciary standards applicable to their officers and directors, liability laws for nonprofits and their volunteers, and enforcement questions. Discussion of the lobbying and political activities of nonprofits, their commercial activities and the related charge of unfair competition, the extent to which nonprofits are subsidized, the justification for subsidizing them, and standing issues. Enrollment may be limited. Prerequisite: Law 420. (Research paper or examination) (Spring—day)

**579 Real Estate and Income Taxation (2)**

**Tucker, Gottlieb**

The effect of income taxes on the real estate market and real estate transactions: sales and exchange of real estate interests, various entities for the ownership and development of real estate, the impact of taxes on the landlord and tenant, the impact of taxes on the mortgagor and mortgagee, including the choice of financing techniques, such as sale-leaseback, depreciation, amortization, and obsolescence; basis and basis adjustments, and casualties and other involuntary conversions. Prerequisite: Law 420. Law 424 is suggested but not required. (Examination)

**580 Natural Resources Taxation (2)**

**Peroni**

Application of federal income tax law to producing segment of oil and gas industry. Classification of interests, treatment of exploration and development expenditures. Depletion allowance and concept of economic interests. Sales vs. leasing transactions. Organization problems. Prerequisite: Law 420. (Examination)

**581 State and Local Taxation (2)**

Taxation by state and local governments; problems of real and personal property taxation, sales and use taxes, business and personal income taxes. Limitations on taxation of interstate commerce. Congressional problems. (Research paper or examination)

**583 Federal Income Taxation of International Transactions (2 or 3)**

**Peroni**

The provisions and policies of federal income tax law applicable to U.S. persons with foreign business and investment activities ("outbound foreign investment") and foreign persons with business and investment activities in the United States ("inbound foreign investment"). These include the source rules for income items and the allocation and apportionment rules for deduction items, the foreign tax credit provisions, the anti-deferral regimes applicable to foreign corporations owned by U.S. persons (e.g., controlled foreign corporations, for-

foreign personal holding companies, and passive foreign investment companies), taxation of U.S. business and investment income realized by foreign persons, dispositions of U.S. real property interests by foreign persons, foreign currency issues, and U.S. tax treaties. Prerequisite: Law 420. (Examination)

**584 Federal Income Taxation of Property Transactions (2)**

An in-depth study of the federal income tax consequences relating to the sale, exchange, or other disposition of property, including stock and securities, real estate, machinery and equipment, commodities, foreign currency, patents and copyrights, contracts, goodwill and going-concern value, franchises, and other tangible and intangible property. The continued significance of the distinction between and effect of capital and ordinary gain or loss. Related areas are also examined, including the alternative minimum tax, disallowance of losses, depreciation recapture and methods of deferring recognition of gain and loss. Prerequisite: Law 420. (Examination)

**585 Federal Income Taxation of Trusts, Estates, and Beneficiaries (2)**

Rules that allocate items of income and deduction between a trust or estate and its beneficiaries. Computation of distributable net income, the distribution deduction, allocation of deductions between trust and beneficiaries, allocation of expenses to particular classes of income, tier system, treatment of specific bequests, and treatment of capital gains. The treatment of certain trusts as owned by the grantor or beneficiary and the special rules taxing certain gains of a trust at the grantor's rate, rules that determine whether a trust will be taxed under the general scheme for taxing trusts or whether it will be treated as owned by the grantor. (Examination)

**588 Tax Practice and Procedure Seminar (2)**

An examination of the procedural aspects of federal tax practice, including both tax controversies and tax planning. Tax controversy topics include audit procedures, IRS administrative appeals, litigation, settlement, claims for refund and collection, and criminal tax matters. Tax planning topics include the legislative process, regulations, ruling requests, technical advice, opinion letters, penalties, and ethical problems. The course emphasizes practical information that is essential in day to day tax practice, both in private law firms and in the government. Prerequisite: 5 credit hours of taxation courses, including Law 420. (Examination and writing assignment)

**591 Legislative Drafting (2)**

P. Smith, Bergman, Goodloe

Advanced instruction and practice in legislative drafting, overview of legislative process with emphasis on legislative drafting. Enrollment limited to 30 students (Problem assignments). (Fall and spring—evening)

**595 Comparative and International Intellectual Property Seminar (1)**

Wegner

This course will be offered periodically in a concentrated series of seven two-hour lectures given over a period of approximately three to four weeks. The seminar will be taught jointly by a leader in the field from Europe or Asia and a host professor from the National Law Center. Specific topics will be announced (Research paper)

**596 Graduate Clinical Studies (1, 2, 3, or 4)**

Staff

Limited to LL.M. candidates. Practical experience in the student's area of specialization or interest. The student may work with a government agency, congressional committee, court, or other such entity performing tasks normally assigned to an attorney. Course approval must be obtained from the student's faculty adviser and/or the dean. Students enrolled in either the Environmental Law or Government Contracts program should refer to Law 414 and Law 597. A maximum of 4 credit hours may be applied toward graduation. Five hours of work per week are required for each credit. The grade CR (Credit) or NC (No Credit) is given for this course. (Fall, spring, summer)

**597 Clinical Studies in Government Contracts Law (2, 3, or 4)**

Lees, J. Schwartz

Students work on a project in the government contracts field under the supervision of the faculty directors of the program and a lawyer practicing government contract law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public-interest organization. Admission to the course requires approval of one of the faculty



directors of the program. The grade *CR* (Credit) or *NC* (No Credit) is given for this course. Five hours of work per week are required for each credit. (Fall and spring—day)

**598 Graduate Independent Legal Writing (1 or 2)**

Staff

Limited to graduate students with at least a *B* average who have had a seminar or comparable course in the field of proposed research. Students are responsible for obtaining an adviser from the full-time faculty who is willing to sponsor their research. This adviser's name must be submitted to the Dean at registration. Work must be completed within the semester. Students may repeat this course once for credit with the approval of the Dean. (Research paper) (Fall, spring, summer)

**599-600 Thesis (2-2)**

Students must register for two successive semesters and cannot register for both sections in one semester. (Fall, spring, summer)

**622 Introduction to American Law (3)**

Buerghenthal

Required for graduate students holding a foreign law degree only, this course focuses on the fundamental doctrinal and methodological characteristics of the American legal system. The approach will be comparative in nature and will deal with selected topics drawn, *inter alia*, from constitutional law, the law of torts, contracts, civil procedure, and conflicts of law. American legal education, the judicial system, and the legal profession are also discussed. (Examination) (Fall—day)

## The University

### History and Organization

The George Washington University had its beginning in 1821 as the Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as president and as private citizen, had urgently insisted upon the establishment of a national university in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter, which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character, it provided "that persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as Foggy Bottom, between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area contains several reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for 50 years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College and Graduate School of Arts and Sciences; the professional schools, which include the National Law Center, the Elliott School of International Affairs, and the Schools of Medicine and Health Sciences, Engineering and Applied Science, Education and Human Development, and Business and Public Management; and the Division of Continuing Education.



## Academic Status

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Schools. The University is on the approved list of the American Association of University Women and is a member of the College Board.

## Location

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

A new campus in Northern Virginia for graduate studies, research projects, and professional development programs is located along the high-tech corridor on Route 7, just to the west of Route 28, in Loudoun County.

## The Board of Trustees of the University

The University is privately endowed and is governed by a Board of Trustees of which the President of the University is an *ex officio* member. Trustees who are GW alumni are indicated by an asterisk. Locations are indicated for trustees outside the Washington metropolitan area.

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### Alumni Associations

#### General Alumni Association

The objectives of this association are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have enrolled in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University.

The affairs of the Association are directed by a Governing Board, the majority of whose members represent the constituent alumni organizations of the University's schools and college. The voluntary leadership of the Association works closely with the staff of the Alumni Relations Office in carrying out Association affairs. The Association may be contacted through the Alumni Relations Office.

#### The George Washington Law Alumni Association

The George Washington Law Alumni Association was founded in 1912 and has been affiliated with the General Alumni Association since 1926. Its purposes as stated in the constitution are to promote high standards of legal education, to keep the alumni of the school in close touch with each other, and to further the interests of

the school. Eligible members are those who have matriculated at the school or National University and have left in good standing, and any member or former member of the faculty of the school. Active members are those eligible members who are current contributors to the Law Annual Support Program of the University and life members of the George Washington Law Alumni Association. The Association periodically publishes the Law Alumni Directory.

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 Jonathan Wilson, J.D.'91  
 Alexander Younger, J.D.'69  
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BA. 1941, University of Georgia; B.S. in L.S. 1947, Columbia University; J.D. 1961, George Washington University

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BA. 1943, University of Illinois; J.D. 1963, University of Florida

#### John Cibinic, Jr., *Professor Emeritus of Law*

BA. 1956, University of Pittsburgh; J.D. 1960, George Washington University

#### Harold Paul Green, *Professor Emeritus of Law*

BA. 1942, J.D. 1948, University of Chicago

#### Louis James Harris, *Professor Emeritus of Law*

BA. 1943, Cornell University; LL.B. 1939, S.J.D. 1942, Brooklyn Law School; LL.M. 1948, George Washington University

#### Anita Kessler Head, *Professor Emeritus of Law*

Lic. Jur. 1955, University of Berne, Switzerland; M.S. in L.S. 1969, Columbia University

#### W. Wallace Kirkpatrick, *Professor Emeritus of Law*

BA. 1934, LL.B. 1938, Harvard University

#### Robert Kramer, *Professor Emeritus of Law; Dean Emeritus of the National Law Center*

BA. 1935, LL.B. 1938, Harvard University

#### William Thomas Mallison, *Professor Emeritus of Law*

J.S.D. 1967, Yale University

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BA. 1938, LL.B. 1941, University of Minnesota; M.P.A. 1942, S.J.D. 1956, Harvard University

#### Ralph Clarke Nash, Jr., *Professor Emeritus of Law*

BA. 1953, Princeton University; J.D. 1957, George Washington University

#### Charles Bernard Nutting, *Professor Emeritus of Law*

BA. 1927, J.D. 1930, University of Iowa; LL.M. 1932, S.J.D. 1933, Harvard University; LL.D. 1957, University of Pittsburgh; Litt.D. 1957, Geneva College; I.H.D. 1957, Seton Hill College; LL.D. 1960, Dickinson School of Law

#### Edward Andrew Potts, *Professor Emeritus of Law*

BA. 1949, University of Michigan; LL.B. 1952, George Washington University

#### Donald Phillip Rothschild, *Professor Emeritus of Law*

BA. 1950, University of Michigan; J.D. 1965, University of Toledo; LL.M. 1966, Harvard University

#### David Benson Weaver, *Professor Emeritus of Law*

BA. 1943, Ohio Wesleyan University; J.D. 1948, Case Western Reserve University

#### Glen Earl Weston, *Oppenheim Professor Emeritus of Antitrust and Trade Regulation Law*

B.S. 1943, University of Maryland; J.D. 1948, George Washington University

### Full-Time and Visiting Faculty and Administrators

#### Jose E. Alvarez, *Associate Professor of Law*

BA. 1977, J.D. 1981, Harvard University; BA. 1979, Oxford University

#### John Banzhaf III, *Professor of Law*

B.S. in E.E. 1962, Massachusetts Institute of Technology; J.D. 1965, Columbia University

#### Jerome Aure Barron, *Lyle T. Alverson Professor of Law*

BA. 1955, Tufts University; J.D. 1958, Yale University; LL.M. 1960, George Washington University

#### Cheryl D. Block, *Professor of Law*

BA. 1976, Hofstra University; J.D. 1979, State University of New York at Buffalo

#### Robert Brauneis, *Visiting Associate Professor of Law*

BA. 1982, University of California, Santa Cruz; J.D. 1989, Harvard University

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BA. 1965, Williams College; J.D. 1968, Harvard University
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BA. 1966, University of Notre Dame; M.D. 1970, Columbia University; J.D. 1977, University of California, Berkeley
- Thomas Buergenthal, *Lobmgier Professor of Comparative Law and Jurisprudence; Director of the International Legal Studies Programs*  
BA. 1957, Bethany College; J.D. 1960, New York University; LL.M. 1961, S.J.D. 1968, Harvard University
- Paul Delano Butler, *Associate Professor of Law*  
BA. 1982, Yale University; J.D. 1986, Harvard University
- Naomi R. Cahn, *Associate Professor of Law*  
BA. 1979, Princeton University; J.D. 1983, Columbia University; LL.M. 1989, Georgetown University
- W. Burlette Carter, *Associate Professor of Law*  
BA. 1982, Agnes Scott College; J.D. 1985, Harvard University
- James Phillip Chandler, *Professor of Law*  
BA. 1963, University of California, Berkeley; J.D. 1970, University of California, Davis; LL.M. 1971, Harvard University
- \*Mary M. Cheh, *Professor of Law*  
BA. 1972, Rutgers University, Douglass College; J.D. 1975, Rutgers University; LL.M. 1977, Harvard University
- Bradford Russell Clark, *Visiting Associate Professor of Law*  
BA. 1981, Florida State University; J.D. 1985, Columbia University
- Ronald K.L. Collins, *Visiting Professor of Law*  
BA. 1971, University of California, Santa Barbara; J.D. 1975, Loyola Marymount University
- Thomas Francis Courtless, Jr., *Professor of Law and of Sociology*  
BA. 1955, Pennsylvania State University; MA. 1960, Ph.D. 1966, University of Maryland
- Charles B. Craver, *Professor of Law, Leroy Sorenson Merrifield Research Professor of Law*  
BS. 1967, M.I.L.R. 1968, Cornell University; J.D. 1971, University of Michigan
- Charles Thomas Dienes, *Professor of Law, Patricia Roberts Harris Research Professor of Law*  
BS. 1961, Loyola University of Chicago; J.D. 1964, Ph.D. 1968, Northwestern University
- Frank D. Durand, *Assistant Dean of the National Law Center, for Student Affairs*  
BA. 1986, University of New Mexico; J.D. 1989, Stanford University
- Jack Harlan Friedenthal, *Professor of Law, Dean of the National Law Center*  
BA. 1953, Stanford University; J.D. 1958, Harvard University
- †Theresa A. Gabaldon, *Professor of Law*  
BS. 1975, University of Arizona; J.D. 1978, Harvard University
- Miriam Galston, *Associate Professor of Law*  
BA. 1967, Cornell University; Ph.D. 1973, University of Chicago; J.D. 1982, Yale University
- Paul Grussendorf, *Associate Professor of Clinical Law*  
BA. 1974, University of Oregon; J.D. 1985, Howard University; LL.M. 1988, George Washington University
- Philip A. Hamburger, *Professor of Law and Legal History*  
BA. 1979, Princeton University; J.D. 1982, Yale University
- Laurent Romain Hourclé, *Associate Professor of Law*  
BS. 1968, Boston University; J.D. 1971, Duke University; MA. 1980, Central Michigan University; LL.M. 1982, George Washington University
- Carol L. Izumi, *Professor of Clinical Law*  
BA. 1976, Oberlin College; J.D. 1980, Georgetown University
- John Smith Jenkins, *Professorial Lecturer in Law, Associate Dean of the National Law Center, for Administrative Affairs*  
BA. 1954, Lafayette College; J.D. 1961, George Washington University; MA. 1966, American University
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BA. 1959, Wesleyan University; LL.B. 1962, Duke University
- Susan Roberta Jones, *Instructor in Clinical Law*  
BA. 1978, Brandeis University; J.D. 1980, MA. 1985, Antioch School of Law
- Richard Dawson Kahlenberg, *Visiting Associate Professor of Law*  
BA. 1985, J.D. 1989, Harvard University

\*On sabbatical leave fall semester 1993 and leave of absence spring semester 1994

†On sabbatical leave fall semester 1993



- Frederick J. Lees, *Visiting Professor of Law*  
BA. 1952, University of Virginia; J.D. 1961, American University
- \*Ira C. Lupu, *Professor of Law; Louis Harkey Mayo Research Professor of Law*  
BA. 1968, Cornell University; J.D. 1971, Harvard University
- Jennifer P. Lyman, *Associate Professor of Clinical Law*  
BA. 1972, Yale University; J.D. 1978, Stanford University
- Gregory Eaton Maggs, *Associate Professor of Law*  
BA. 1985, J.D. 1988, Harvard University
- Charles M. Masner, *Instructor in Clinical Law*  
BA. 1973, B.S.E. 1974, University of Kansas; M.S. 1976, Emporia State University; J.D. 1982, Washburn University; LL.M. 1991, George Washington University
- Joan S. Meier, *Associate Professor of Clinical Law*  
BA. 1980, Harvard University; J.D. 1983, University of Chicago
- \*Lawrence E. Mitchell, *Professor of Law*  
BA. 1978, Williams College; J.D. 1981, Columbia University
- Thomas D. Morgan, *Oppenheim Professor of Antitrust and Trade Regulation Law*  
BA. 1962, Northwestern University; J.D. 1965, University of Chicago
- †Beth Nolan, *Associate Professor of Law*  
BA. 1973, Scripps College; J.D. 1980, Georgetown University
- William H. Painter, *Theodore Rinehart Professor of Business Law*  
BA. 1950, Princeton University; J.D. 1954, Harvard University
- Scott B. Pagel, *Associate Professor of Law; Librarian of the Law Library*  
BA. 1972, Michigan State University; MA. in L.S. 1977, University of Michigan; J.D. 1985, University of California, Berkeley
- Robert Eugene Park, *Professor of Law*  
B.S. 1952, BA. 1957, J.D. 1961, University of Florida; LL.M. 1965, Yale University
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B.S.C. 1973, DePaul University; J.D. 1976, Northwestern University; LL.M. 1980, New York University
- ‡Todd D. Peterson, *Associate Professor of Law*  
BA. 1973, Brown University; J.D. 1976, University of Michigan
- Maximilian Pock, *Professor of Law*  
J.D. 1958, University of Iowa; S.J.D. 1962, University of Michigan
- Peter Raven-Hansen, *Professor of Law; Glen Earl Weston Research Professor of Law*  
BA. 1968, J.D. 1974, Harvard University
- Arnold Winfred Reitze, Jr., *Professor of Law; Elyce Zenoff Research Professor of Law; Director of the Environmental Law Program*  
BA. 1960, Fairleigh Dickinson University; J.D. 1962, Rutgers University; M.P.H. 1985, Johns Hopkins University
- Alfreda Robinson, *Professorial Lecturer in Law; Associate Dean of the National Law Center for Student Affairs*  
BA. 1973, M.A. 1976, University of Chicago; J.D. 1978, George Washington University
- David Robinson, Jr., *Professor of Law*  
BA. 1950, Reed College; J.D. 1956, Columbia University; LL.M. 1965, Harvard University
- Stephen Allan Saltzburg, *Hourey Professor of Trial Advocacy, Litigation, and Professional Responsibility*  
BA. 1967, Dickinson College; J.D. 1970, University of Pennsylvania
- Joan E. Schaffner, *Associate Professor of Law*  
B.S. 1979, University of Southern California; M.S. 1981, Massachusetts Institute of Technology; J.D. 1990, University of Southern California
- Roger Edward Schechter, *Professor of Law; William Thomas Fryer Research Professor of Law*  
BA. 1973, George Washington University; J.D. 1976, Harvard University
- Lewis Aaron Schiller, *Professor of Law*  
BA. 1950, LL.B. 1952, University of Texas; M.A. 1958, Tufts University
- Nancy L. Schultz, *Instructor in Law; Assistant Dean of the National Law Center; Director of Legal Research and Writing*  
BA. 1978, University of Wisconsin; J.D. 1981, University of Pennsylvania

\*On sabbatical leave spring semester 1994

†On sabbatical leave academic year 1993-1994.

‡On sabbatical leave fall semester 1993

- Joshua Ira Schwartz, *Professor of Law; Director of the Government Procurement Law Program*  
BA. 1973, Harvard University; J.D. 1976, M.P.R. 1977, Cornell University
- Teresa Moran Schwartz, *Professor of Law*  
BA. 1965, Stanford University; J.D. 1971, George Washington University
- \*David Earl Seidelson, *Lyle T. Alverson Professor of Law*  
BA. 1951, LL.B. 1956, University of Pittsburgh
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BA. 1950, University of North Carolina; LL.B. 1955, S.J.D. 1969, Harvard University
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BA. 1972, Vassar College; J.D. 1975, Yale University
- Theodore Stuart Sims, *Professor of Law*  
BA. 1967, Columbia University; J.D. 1970, University of Chicago
- †Eric Scott Sirulnik, *Professor of Law; Director of Clinical Programs*  
BA. 1965, Franklin and Marshall College; J.D. 1968, Boston University; LL.M. 1970, George Washington University
- Louis B. Sohn, *Distinguished Research Professor of Law*  
Dipl.Sc.M. 1935, LL.M. 1935, John Casimir University; LL.M. 1940, S.J.D. 1958, Harvard University
- ‡Lewis David Solomon, *Professor of Law; Arthur Selwyn Miller Research Professor of Law*  
BA. 1963, Cornell University; J.D. 1966, Yale University
- John A. Spanogle, Jr., *Professor of Law; William Wallace Kirkpatrick Research Professor of Law*  
B.S.E. in E.E. 1957, Princeton University; J.D. 1960, University of Chicago
- Robert V. Stanek, *Assistant Dean of the National Law Center; Director of Admissions and Financial Aid*  
BA. 1966, Pennsylvania State University; J.D. 1979, George Washington University
- James Edward Starrs, *Professor of Law and of Forensic Sciences*  
BA., LL.B. 1958, St. John's University, New York; LL.M. 1959, New York University
- Ralph Gustav Steinhardt, *Professor of Law; Associate Director of the International Legal Studies Programs*  
BA. 1976, Bowdoin College; J.D. 1980, Harvard University
- Joan H. Strand, *Professor of Clinical Law*  
BA. 1972, J.D. 1975, George Washington University
- Alice M. Sullivan, *Associate Professor of Clinical Law*  
BA. 1983, Boston College; J.D. 1986, George Washington University
- Roger Hans Transrud, *Professor of Law; Associate Dean of the National Law Center, for Academic Affairs*  
BA. 1972, Carleton College; J.D. 1975, University of Chicago
- Jonathan Turley, *Professor of Law*  
BA. 1983, University of Chicago; J.D. 1987, Northwestern University
- Silas J. Wasserstrom, *Visiting Professor of Law*  
BA. 1964, Amherst College; J.D. 1967, Yale University
- Harold C. Wegner, *Professor of Law; Director of the Intellectual Property Law Program*  
BA. 1965, Northwestern University; J.D. 1969, Georgetown University
- §Arthur Edward Wilmarth, Jr., *Associate Professor of Law*  
BA. 1972, Yale University; J.D. 1975, Harvard University
- Luize Elizabeth Zubrow, *Professor of Law*  
BA. 1969, J.D. 1972, University of Colorado

### Adjunct Faculty

- Daniel B. Abrahams, *Associate Professorial Lecturer in Law*  
BA. 1977, Hobart College, MA. 1979, Washington University; J.D. 1983, George Washington University
- Gary C. Adler, *Professorial Lecturer in Law*  
BA. 1990, George Washington University; J.D. 1985, Catholic University of America

\*On sabbatical leave spring semester 1994

†On sabbatical leave fall semester 1994

‡On leave of absence fall semester 1993

§On leave of absence academic year 1993-1994.



- The Honorable Joanne F. Alper, *Professorial Lecturer in Law*  
BA 1972, Syracuse University; J.D. 1975, George Washington University
- Kimberly E. Arrigo, *Associate Professorial Lecturer in Law*  
BS 1982, Michigan State University; J.D. 1991, University of Miami
- Lon Babby, *Professorial Lecturer in Law*  
BA 1973, Lehigh University; J.D. 1976, Yale University
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BA 1983, Wichita State University; M.Sc. 1984, London School of Economics; J.D. 1991, University of Kansas
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BA 1946, Wellesley College; M.D. 1949, Cornell University
- Isaac David Benkin, *Professorial Lecturer in Law*  
BA 1956, LL.B. 1959, Harvard University
- Robert Alan Bergman, *Professorial Lecturer in Law*  
BA 1972, Brown University; J.D. 1976, University of Southern California
- Curtis G. Berkey, *Professorial Lecturer in Law*  
BS 1974, Eastern Mennonite College; J.D. 1979, Catholic University of America
- Carol Bettencourt, *Adjunct Instructor in Law*  
BA 1981, Bard College; J.D. 1984, Stanford University
- William H. Bradford, Jr., *Professorial Lecturer in Law*  
BS 1959, J.D. 1962, Duke University; LL.M. 1964, George Washington University
- Joseph I. Brand, *Professorial Lecturer in Law*  
BA 1958, University of Michigan; MA 1959, Ohio State University; J.D. 1965, George Washington University
- Jenny A. Brody, *Professorial Lecturer in Law*  
BA 1977, University of Pennsylvania; J.D. 1981, Harvard University
- Brian Garrett Brunsvold, *Professorial Lecturer in Law*  
BS 1960, Iowa State University of Science and Technology; J.D. 1967, George Washington University
- John A. Buchman, *Professorial Lecturer in Law*  
B.S.E.S. 1977, Georgetown University; J.D. 1980, Harvard University
- Albert F. Cacoza, Jr., *Professorial Lecturer in Law*  
BA 1978, Brown University; J.D. 1982, University of Chicago
- Julie E. Carnes, *Professorial Lecturer in Law*  
BA 1972, J.D. 1975, University of Georgia
- James P. Carroll, *Professorial Lecturer in Law*  
BA 1974, Georgetown University; J.D. 1977, Catholic University of America
- Bruce J. Casino, *Professorial Lecturer in Law*  
BS 1984, University of Maryland; J.D. 1988, Georgetown University
- Joy Chambers, *Professorial Lecturer in Law*  
BA 1968, J.D. 1971, George Washington University
- Arthur E. Cirulnick, *Associate Professorial Lecturer in Law*  
BA 1975, University of California, Santa Barbara; J.D. 1979, University of San Francisco
- Lois R. Coon, *Adjunct Instructor in Law*  
BA 1958, College of New Rochelle; MA 1962, College of St. Rose; J.D. 1984, Catholic University of America
- Thomas J. Connelly, *Professorial Lecturer in Law*  
BS 1972, U.S. Naval Academy; J.D. 1980, Loyola University; LL.M. 1989, George Washington University
- Thomas F. Cooney III, *Professorial Lecturer in Law*  
BA 1974, Dartmouth College; J.D. 1978, University of Michigan
- John J. Delaney, *Professorial Lecturer in Law*  
BS 1954, LL.B. 1960, Georgetown University
- Margaret Mann Drachsler, *Professorial Lecturer in Law*  
BA 1969, J.D. 1975, George Washington University
- Robert G. Dreher, *Associate Professorial Lecturer in Law*  
BA 1973, Harvard University; MA 1979, Brown University; J.D. 1981, Yale University
- Jane Moretz Edmisten, *Professorial Lecturer in Law*  
BA 1960, MA 1962, University of North Carolina; J.D. 1967, George Washington University
- Robert C. Effros, *Professorial Lecturer in Law*  
BA 1954, LL.B. 1957, Harvard University; LL.M. 1965, Georgetown University
- Alan M. Ehrlich, *Associate Professorial Lecturer in Law*  
BA 1963, State University of New York at Buffalo; MS 1965, Ph.D. 1968, Massachusetts Institute of Technology  
M.B.A. 1972, Georgia State University; J.D. 1991, George Washington University
- Phil Feola, *Associate Professorial Lecturer in Law*  
BA 1969, University of Notre Dame; MS 1971, Florida State University; J.D. 1979, Catholic University of America

- Gerald I. Fisher, *Adjunct Instructor in Law*  
BA 1972, College of William and Mary; J.D. 1978, Catholic University of America
- KellyAnne E. Fitzpatrick, *Associate Professorial Lecturer in Law*  
BA 1989, Trinity College; J.D. 1992, George Washington University
- Jonathan J. Fleuchaus, *Associate Professorial Lecturer in Law*  
BA 1977, Haverford College; J.D. 1981, University of Florida; LL.M. 1987, George Washington University
- Michael Richard Flyer, *Professorial Lecturer in Law*  
BA 1959, LL.B. 1962, University of Michigan
- Frederic Freilicher, *Professorial Lecturer in Law*  
BA 1960, Harvard University; J.D. 1963, Columbia University
- Gregory B. Friel, *Associate Professorial Lecturer in Law*  
BA 1984, Marshall University; J.D. 1988, Harvard University
- Darya Geeter, *Associate Professorial Lecturer in Law*  
BA 1983, University of Chicago; J.D. 1988, New York University
- Michael S. Gelacak, *Professorial Lecturer in Law*  
BA 1963, J.D. 1968, Syracuse University
- Elizabeth Glass Geltman, *Associate Professorial Lecturer in Law*  
BA 1983, Cornell University; J.D. 1986, University of Baltimore; LL.M. 1989, Georgetown University
- The Honorable Herman F. Gierke, *Professorial Lecturer in Law*  
BA 1964, J.D. 1966, University of North Dakota
- Francis A. Gilligan, *Professorial Lecturer in Law*  
BA 1961, Alfred University; J.D. 1964, State University of New York, Buffalo; LL.M. 1970, S.J.D. 1976, George Washington University
- Gilbert Jerome Ginsburg, *Professorial Lecturer in Law*  
BA 1954, BA in Law 1955, J.D. 1957, University of Chicago
- Peter M. Goodloe, *Associate Professorial Lecturer in Law*  
BS 1982, Birmingham Southern College; J.D. 1985, Vanderbilt University
- Larry A. Gordon, *Associate Professorial Lecturer in Law*  
BS 1973, Pennsylvania State University; M.C.P. 1976, University of Pennsylvania; J.D. 1982, Catholic University of America
- Robert G. Gottlieb, *Professorial Lecturer in Law*  
BA 1973, Pennsylvania State University; J.D. 1976, George Washington University
- Jefferson M. Gray, *Professorial Lecturer in Law*  
BA 1978, Yale University; M.Sc. London School of Economics; M.A. 1980, University of London; J.D. 1983, Harvard University
- Susan Haberman Griffen, *Professorial Lecturer in Law*  
BS 1978, Iowa State University; J.D. 1982, University of Iowa
- Benjamin H. Grumbles, *Associate Professorial Lecturer in Law*  
BA 1982, Wake Forest University; J.D. 1985, Emory University; LL.M. 1991, George Washington University
- Samuel I. Gutter, *Professorial Lecturer in Law*  
BA 1974, Tufts University; J.D. 1977, George Washington University
- The Honorable James S. Halpern, *Professorial Lecturer in Law*  
BS 1967, J.D. 1972, University of Pennsylvania; LL.M. 1975, New York University
- Ann Marie Hay, *Adjunct Instructor in Law*  
BA 1963, University of California, Berkeley; BS 1968, University of Minnesota; J.D. 1978, Georgetown University
- Mark E. Herzog, *Adjunct Instructor in Law*  
BS 1982, University of Florida; J.D. 1986, George Washington University
- Michael M. Hicks, *Associate Professorial Lecturer in Law*  
BA 1978, Haverford College; J.D. 1981, George Washington University
- Sheila Slocum Hollis, *Professorial Lecturer in Law*  
BS 1971, University of Colorado; J.D. 1973, University of Denver
- Marian Blank Horn, *Professorial Lecturer in Law*  
BA 1965, Barnard College; J.D. 1969, Fordham University
- Mori Irvine, *Associate Professorial Lecturer in Law*  
BA 1977, Lehigh University; J.D. 1980, Gonzaga University
- Gerald F. Ivey, *Associate Professorial Lecturer in Law*  
BA 1979, J.D. 1982, University of Virginia
- The Honorable Thomas Penfield Jackson, *Professorial Lecturer in Law*  
BA 1958, Dartmouth College; LL.B. 1964, Harvard University; Judge, United States District Court for the District of Columbia
- Howard Marshall Jarrett, *Associate Professorial Lecturer in Law*  
BS 1966, J.D. 1969, West Virginia University



- Thomas B. Johnston, *Associate Professorial Lecturer in Law*  
B.S. 1976, College of William and Mary; M.S. 1979, Ohio State University; J.D. 1986, George Washington University
- Maurice H. Klitzman, *Professorial Lecturer in Law*  
B.S. 1948, Purdue University; J.D. 1951, George Washington University
- Stephen D. Knight, *Professorial Lecturer in Law*  
B.A. 1975, J.D. 1978, University of Virginia
- James A. Kohm, *Adjunct Instructor in Law*  
B.A. 1984, University of Michigan; J.D. 1989, Georgetown University
- William Kominers, *Professorial Lecturer in Law*  
B.S. 1973, B.Arch. 1974, Rensselaer Polytechnic Institute; J.D. 1977, George Washington University
- Kenneth John Kryvoruka, *Professorial Lecturer in Law*  
B.A. 1973, Rutgers College; J.D. 1977, University of Akron; LL.M. 1979, George Washington University
- Peggy Kuo, *Associate Professorial Lecturer in Law*  
B.A. 1985, Yale University; J.D. 1988, Harvard University
- Jeffrey Paul Kushan, *Associate Professorial Lecturer in Law*  
B.S. 1985, College of William and Mary; M.A. 1987, University of North Carolina; J.D. 1992, George Washington University
- Edward Victor Alphonse Kussy, *Professorial Lecturer in Law*  
B.A. 1968, J.D. 1971, University of Michigan; LL.M. 1981, George Washington University
- James P. Lamoureux, *Associate Professorial Lecturer in Law*  
B.A. 1987, Northwestern University; J.D. 1990, University of California, Los Angeles
- Michael G. Lenett, *Associate Professorial Lecturer in Law*  
B.A. 1984, Brandeis University; M.A. 1988, J.D. 1988, LL.M. 1992, Georgetown University
- The Honorable Richard A. Levie, *Professorial Lecturer in Law*  
B.A. 1966, Dickinson College; J.D. 1969, George Washington University, Judge, Superior Court of the District of Columbia
- Arthur N. Levine, *Professorial Lecturer in Law*  
B.A. 1967, University of California, Los Angeles; J.D. 1970, University of California, Berkeley
- Mark Levinstein, *Professorial Lecturer in Law*  
B.A. 1979, University of Virginia; J.D. 1982, Harvard University
- Henry M. Lloyd, *Professorial Lecturer in Law*  
B.A. 1956, Cornell University; BA. 1960, MA. 1964, Oxford University; J.D. 1973, Georgetown University
- Sylvia K. Lowrance, *Professorial Lecturer in Law*  
B.A. 1975, University of Michigan; J.D. 1982, Catholic University of America
- R. V. Lupo, *Professorial Lecturer in Law*  
B.S.(E.E.) 1963, J.D. 1968, George Washington University
- Barbara Anne Mack, *Associate Professorial Lecturer in Law*  
B.A. 1985, University of Alabama; J.D. 1988, Georgetown University
- Edward R. Mackiewicz, *Professorial Lecturer in Law*  
B.A. 1973, Yale University; J.D. 1976, Columbia University
- Martin G. Malsch, *Professorial Lecturer in Law*  
B.S. 1964, College of the Holy Cross; J.D. 1968, University of Connecticut
- Robin Markush, *Adjunct Instructor in Law*  
B.A. 1981, Barnard College; J.D. 1987, Georgetown University
- Frances Elisabeth Marshall, *Associate Professorial Lecturer in Law*  
B.A. 1982, Carleton College; J.D. 1988, University of California, Berkeley
- The Honorable H. Robert Mayer, *Professorial Lecturer in Law*  
B.S. 1963, U.S. Military Academy; J.D. 1971, College of William and Mary
- Kenneth Everett Melson, *Professorial Lecturer in Law*  
B.A. 1970, Denison University; J.D. 1973, George Washington University
- Peter H. Meyers, *Professorial Lecturer in Law*  
B.A. 1968, Marietta College; J.D. 1971, George Washington University
- Michael G. Michaelson, *Associate Professorial Lecturer in Law*  
B.A. 1968, Johns Hopkins University; M.D. 1973, University of Pennsylvania; J.D. 1984, Harvard University
- The Honorable Paul R. Michel, *Professorial Lecturer in Law*  
B.A. 1963, Williams College; J.D. 1966, University of Virginia
- Alan S. Miller, *Professorial Lecturer in Law*  
B.A. 1971, Cornell University; M.P.P. 1974, J.D. 1974, University of Michigan
- Terry Elaine Miller, *Professorial Lecturer in Law*  
B.S. 1971, Cornell University; M.A. 1974, Columbia University; J.D. 1982, American University
- Ronald V. Minionis, *Adjunct Instructor in Law*  
B.A. 1985, Amherst College; J.D. 1990, University of Virginia

- The Honorable Zinora M. Mitchell-Rankin, *Professorial Lecturer in Law*  
 BA. 1976, Spelman College; J.D. 1979, George Washington University
- Frank C. Morris, *Professorial Lecturer in Law*  
 B.S. 1970, Northwestern University; J.D. 1973, University of Virginia
- Raymond W. Mushal, *Professorial Lecturer in Law*  
 BA. 1966, Yale University; J.D. 1973, University of Pennsylvania
- Jerome C. Muys, *Professorial Lecturer in Law*  
 BA. 1954, Princeton University; J.D. 1957, Stanford University
- Nathan A. Neal, *Adjunct Instructor in Law*  
 BA. 1983, George Washington University; J.D. 1987, Howard University
- Alfred H. Novotne, *Professorial Lecturer in Law*  
 BA. 1975, University of Chicago; J.D. 1981, DePaul University; LL.M. 1987, George Washington University
- Barry M. Nudelman, *Professorial Lecturer in Law*  
 BA. 1968, University of Pittsburgh; J.D. 1971, George Washington University; LL.M. 1981, Georgetown University
- Harriet L. Oler, *Professorial Lecturer in Law*  
 BA. 1963, Dickinson College; J.D. 1966, University of Pennsylvania
- Ralph Oman, *Professorial Lecturer in Law*  
 BA. 1963, Hamilton College; J.D. 1973, Georgetown University
- Catherine V. Pagano, *Associate Professorial Lecturer in Law*  
 BA. 1975, University of Georgia; M.A. 1977, Indiana University; J.D. 1984, Stanford University
- Jason S. Palmer, *Associate Professorial Lecturer*  
 BA. 1988, University of Virginia; J.D. 1991, George Washington University
- Neal Bennett Parker, *Associate Professorial Lecturer in Law*  
 BA. 1986, University of Virginia; J.D. 1991, George Washington University
- W. Hays Parks, *Professorial Lecturer in Law*  
 BA. 1963, J.D. 1966, Baylor University
- David Andreas Peterson, *Professorial Lecturer in Law*  
 BA. 1964, Occidental College; J.D. 1967, M.B.A. 1968, George Washington University; M.P.A. 1974, Harvard University; Ph.D. 1975, Johns Hopkins University
- Peter Plocki, *Professorial Lecturer in Law*  
 BA. 1979, Swarthmore College; J.D. 1983, George Washington University
- Mark D. Polston, *Associate Professorial Lecturer*  
 BA. 1985, University of Dayton; J.D. 1988, Harvard University
- Lynn David Poole, *Professorial Lecturer in Law*  
 BA. 1960, LL.B. 1965, Harvard University; LL.M. 1970, Georgetown University
- Mary Ellen Powers, *Professorial Lecturer in Law*  
 BA. 1977, Oberlin College; J.D. 1980, University of Virginia
- Theodore L. Press, *Professorial Lecturer in Law*  
 BA. 1965, Cornell University; J.D. 1968, Columbia University
- Griffith Price, *Professorial Lecturer in Law*  
 BA. 1964, Harvard University; LL.B. 1967, New York University
- Kathleen T. Quinn, *Associate Professorial Lecturer in Law*  
 BA. 1982, J.D. 1986, Fordham University
- The Honorable Randall R. Rader, *Professorial Lecturer in Law*  
 BA. 1974, Brigham Young University; J.D. 1978, George Washington University
- Stephanie Ridder, *Professorial Lecturer in Law*  
 BA. 1974, Harvard University; J.D. 1977, University of Virginia
- Bruno A. Ristau, *Professorial Lecturer in Law*  
 B.B.A. 1956, J.D. 1958, Case Western Reserve University; LL.M. 1960, Georgetown University
- Karen Y. Roberts, *Associate Professorial Lecturer in Law*  
 BA. 1986, Vassar College; M.A. 1988, Georgetown University; J.D. 1991, George Washington University
- Anne Templeman Robinson, *Associate Professorial Lecturer in Law*  
 BA. 1980, Iowa State University; M.A. 1986, University of Iowa; J.D. 1990, George Washington University
- Florence Wagman Roisman, *Professorial Lecturer in Law*  
 BA. 1959, University of Connecticut; LL.B. 1963, Harvard University
- Peter O. Safir, *Professorial Lecturer in Law*  
 BA. 1967, Princeton University; J.D. 1972, Yale University
- Paul E. Salmon, *Associate Professorial Lecturer in Law*  
 B.S. 1985, University of Notre Dame; J.D. 1990, George Washington University
- Jeffrey M. Samuels, *Professorial Lecturer in Law*  
 BA. 1972, Colgate University; J.D. 1975, Albany Law School



- Judith Sandalow, *Adjunct Instructor in Law*  
B.A. 1984, Swarthmore College; J.D. 1990, Yale University
- Michael Sanders, *Professorial Lecturer in Law*  
B.S. 1960, LL.B. 1964, New York University; LL.M. 1967, Georgetown University
- Laura Lynn Sardo, *Associate Professorial Lecturer in Law*  
B.A. 1980, College of William and Mary; J.D. 1987, George Washington University
- C. Edward Schacklee, *Adjunct Instructor in Law*  
B.A. 1976, Butler University; J.D. 1979, Georgetown University
- Cynthia Ann Schnedar, *Associate Professorial Lecturer in Law*  
B.A. 1983, University of New Mexico; J.D. 1988, University of Texas
- Steven M. Schneebaum, *Professorial Lecturer in Law*  
B.A. 1969, Yale University; M.A. 1970, Oberlin College; B.A. 1976, Oxford University; M.C.L.(AP) 1977, George Washington University
- Raymond S. Sczudlo, *Professorial Lecturer in Law*  
B.C.E. 1971, University of Detroit; J.D. 1974, Georgetown University
- Karin P. Sheldon, *Professorial Lecturer in Law*  
B.A. 1967, Vassar College; J.D. 1970, University of Washington
- Anthony L. Shurn, *Associate Professorial Lecturer in Law*  
B.A. 1984, Western Michigan University; J.D. 1987, American University
- David C. Silver, *Associate Professorial Lecturer in Law*  
B.S. 1981, Lehigh University; J.D. 1988, Georgetown University
- Milton L. Smith, *Professorial Lecturer in Law*  
B.S. 1973, U.S. Air Force Academy; J.D. 1976, George Washington University; LL.M. 1984, D.C.L. 1989, McGill University, Canada
- Paul Smith, *Professorial Lecturer in Law*  
B.A. 1966, California State University, Long Beach; J.D. 1972, University of Southern California
- Deborah S. Smolover, *Associate Professorial Lecturer in Law*  
B.A. 1985, J.D. 1988, Harvard University
- Stacey Sobel, *Associate Professorial Lecturer in Law*  
B.A. 1986, State University of New York at Albany; J.D. 1991, George Washington University
- Richard Stern, *Professorial Lecturer in Law*  
B.A. 1953, B.S.E.E. 1954, Columbia University; LL.B. 1959, Yale University
- Richard W. Stevens, *Associate Professorial Lecturer in Law*  
B.A. 1978, University of California, San Diego; J.D. 1988, University of San Diego
- Margaret Strand, *Professorial Lecturer in Law*  
B.A. 1968, University of Rochester; M.A. 1971, University of Rhode Island; J.D. 1976, College of William and Mary
- Charles F. Stuart, *Professorial Lecturer in Law*  
B.A. 1972, Duke University; J.D. 1978, George Washington University
- Howard J. Symons, *Professorial Lecturer in Law*  
B.A. 1975, Yale University; J.D. 1978, Harvard University
- Donna M. Tanguay, *Professorial Lecturer in Law*  
B.A. 1978, J.D. 1987, Catholic University of America
- Morton S. Taubman, *Professorial Lecturer in Law*  
B.S. 1965, J.D. 1969, University of Baltimore
- Rene D. Tegtmeier, *Professorial Lecturer in Law*  
B.S.Mech.Eng. 1956, Washington University; J.D. 1963, George Washington University
- Steve Teplitz, *Associate Professorial Lecturer in Law*  
B.A. 1988, Colby College; J.D. 1991, George Washington University
- Stefan Franklin Tucker, *Professorial Lecturer in Law*  
B.B.A. 1960, J.D. 1963, University of Michigan
- Robert W. Tuttle, *Associate Professorial Lecturer in Law*  
B.A. 1985, College of William and Mary; M.A. 1989, Lutheran School of Theology at Chicago; J.D. 1991, George Washington University
- The Honorable Ricardo M. Urbina, *Professorial Lecturer in Law*  
B.A. 1967, J.D. 1970, Georgetown University
- Marlana R. Valdez, *Professorial Lecturer in Law*  
B.A. 1976, J.D. 1979, University of Texas
- David A. Wanger, *Adjunct Instructor in Law*  
B.A. 1981, University of Pennsylvania; J.D. 1984, University of Michigan
- Jerry M. Wiener, *Leon Yochelson Professor of Psychiatry and Behavioral Sciences; Professorial Lecturer in Law*  
M.D. 1956, Baylor University



**The Honorable Susan Holmes Winfield, *Professorial Lecturer in Law***

BA. 1970, University of Pennsylvania; J.D. 1976, Boston College

**Lance D. Wood, *Professorial Lecturer in Law***

BA. 1970, University of Richmond; J.D. 1973, University of Michigan; LL.M. 1977, George Washington University

**Other University Faculty with Law Degrees****Avery DeLano Andrews, *Associate Professor of History; Assistant Dean of Columbian College and Graduate School of Arts and Sciences***

BA. 1950, Harvard University; LL.B. 1953, M.A. 1958, Ph.D. 1962, University of Pennsylvania

**Stephen Reed Chitwood, *Professor of Public Administration***

BA. 1962, University of Colorado; M.P.A. 1965, Ph.D. 1966, University of Southern California; J.D. 1977, George Washington University

**Kurt John Darr, *Professor of Hospital Administration and of Health Care Sciences***

BA. 1961, Concordia College, Minnesota; J.D. 1964, M.H.A. 1966, University of Minnesota; D.Sc. 1973, Johns Hopkins University

**William A. Davis, *Professor of Public Administration***

BA. 1963, Amherst College; J.D. 1968, M.U.S. 1972, Yale University

**Henry L. Ernstthal, *Associate Professor of Public Administration***

BA. 1962, Wesleyan University; J.D. 1965, Stanford University

**Michael Graham Gallagher, *Professor of Accountancy***

BA. in Govt. 1960, J.D. 1964, LL.M. 1971, George Washington University; C.P.A. 1965 State of Virginia

**Daniel R. Kane, *Assistant Professor of Business Administration***

B.S. 1953, George Washington University; B.S.F.S. 1954, J.D. 1956, LL.M. 1964, Georgetown University

**Jill Felice Kasle, *Associate Professor of Public Administration; University Marshal***

B.S. 1968, M.S. 1969, Northwestern University; J.D. 1972, Boston University

**James Edwin Kee, *Professor of Public Administration***

BA. 1966, University of Notre Dame; J.D. 1969, M.P.A. 1977, New York University

**Mark S. Klock, *Associate Professor of Finance***

BA. 1978, Pennsylvania State University; Ph.D. 1983, Boston College; J.D. 1988, University of Maryland

**Marie C. Malaro, *Professor of Museum Studies; Director, Museum Studies Program***

BA. 1954, Regis College; LL.B. 1957, Boston College

**James Carl Miller, *Professor of Psychology***

BA. 1958, J.D. 1962, Ph.D. 1966, Yale University

**Leo Carl Moersen, *Assistant Professor of Accountancy and Business Law***

B.S. 1976, University of Connecticut; J.D. 1981, College of William and Mary

**Keith E. Smith, *Associate Professor of Accountancy***

BA. 1966, University of Pennsylvania; J.D. 1976, LL.M. 1978, University of Florida

**Stephen Joel Trachtenberg, *Professor of Public Administration; President of the University***

BA. 1959, Columbia University; J.D. 1962, Yale University; M.P.A. 1966, Harvard University; L.H.D. 1986, Trinity College (Connecticut); LL.D. 1990, Hanyang University, Korea



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## Degrees Offered by The George Washington University

*Columbian College and Graduate School of Arts and Sciences:* Bachelor of Arts (B.A.), Bachelor of Music (B.Mus.), Bachelor of Science (B.S.), Master of Arts (M.A.), Master of Fine Arts (M.F.A.), Master of Forensic Sciences (M.F.S.), Master of Science (M.S.), Master of Science in Forensic Science (M.S.F.S.), Master of Philosophy (M.Phil.), and Doctor of Philosophy (Ph.D.)

*School of Medicine and Health Sciences:* Associate in Science (A.S.), Bachelor of Science (B.S.), Bachelor of Science in Health Science (B.S. in H.Sc.), Master of Public Health (M.P.H.), Master of Science in Health Sciences (M.S. in H.S.), and Doctor of Medicine (M.D.)

*National Law Center:* Juris Doctor (J.D.), Master of Laws (LL.M.), and Doctor of Juridical Science (S.J.D.)

*School of Engineering and Applied Science:* Bachelor of Science (Civil Engineering) (B.S.[C.E.]), Bachelor of Science (Computer Engineering) (B.S.[C.Eng.]), Bachelor of Science (Computer Science) (B.S.[C.S.]), Bachelor of Science (Electrical Engineering) (B.S.[E.E.]), Bachelor of Science (Mechanical Engineering) (B.S.[M.E.]), Bachelor of Science (Systems Analysis and Engineering) (B.S.[S.A.&E.]), Master of Engineering Management (M.E.M.), Master of Science (M.S.), Engineer (Engr.), Applied Scientist (App.Sc.), and Doctor of Science (D.Sc.)

*School of Education and Human Development:* Bachelor of Human Services (B.Hm.Sr.), Bachelor of Science in Exercise and Sport Science (B.S. in Ex.Sp.), Master of Arts in Education and Human Development (M.A. in Ed.&H.D.), Master of Arts in Teaching (M.A.T.), Master of Education (M.Ed.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

*School of Business and Public Management:* Bachelor of Accountancy (B.Accy.), Bachelor of Business Administration (B.B.A.), Master of Accountancy (M.Accy.), Master of Association Management (M.A.M.), Master of Business Administration (M.B.A.), Master of Health Services Administration (M.H.S.A.), Master of Public Administration (M.P.A.), Master of Science in Information Systems Technology (M.S. in I.S.T.), Master of Taxation (M.T.), Specialist in Health Services Administration (Spec. in H.S.A.), and Doctor of Philosophy (Ph.D.)

*Elliott School of International Affairs:* Bachelor of Arts (B.A.) and Master of Arts (M.A.)